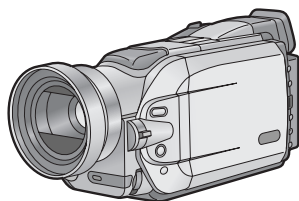


Panasonic®

Digital Video Camera/Recorder Operating Instructions



Model No. **AG-EZ50UP**



MultiMediaCard™



Mini **DV**

LEICA
DICOMAR

Before attempting to connect, operate or adjust this product, please read these instructions thoroughly.

VQT9420

Things You Should Know

Thank you for choosing Panasonic!

You have purchased one of the most sophisticated and reliable products on the market today. Used properly, we're sure it will bring you and your family years of enjoyment. Please take time to fill in the information below. The serial number is on the tag located on the underside of your Camera/Recorder. Be sure to **retain this manual** as your convenient Camera/Recorder information source.

Date of Purchase _____

Dealer Purchased From _____

Dealer Address _____

Dealer Phone No. _____

Model No. AG-EZ50UP

Serial No. _____

Safety Precautions

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.





Your Mini DV Camera/Recorder is designed to record and play back in Standard Play (SP) mode and Long Play (LP) mode.

It is recommended that only cassette tapes that have been tested and inspected for use in VCR machines with the Mini DV mark be used.

CAUTION: TO PREVENT FIRE OR SHOCK HAZARD AND ANNOYING INTERFERENCE, USE THE RECOMMENDED ACCESSORIES ONLY.

CAUTION: TO PREVENT ELECTRIC SHOCK, MATCH WIDE BLADE OF PLUG TO WIDE SLOT, FULLY INSERT.

WARNING: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE.

 CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN 	 <p>This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.</p>
CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK) NO USER-SERVICEABLE PARTS INSIDE REFER SERVICING TO QUALIFIED SERVICE PERSONNEL	 <p>This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.</p>

The above markings are located on the appliance bottom cover.

FCC NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: To assure continued compliance, follow the attached installation instructions and use only shielded interface cables with ferrite cores when connecting to computer or peripheral devices.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

Trade Name:	Panasonic
Model No.:	AG-EZ50UP
Responsible party:	Matsushita Electric Corporation of America 3330 Cahuenga Blvd. West, Los Angeles, CA 90068
Support Contact:	Panasonic Broadcast & Television Systems Company 1-323-436-3500

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

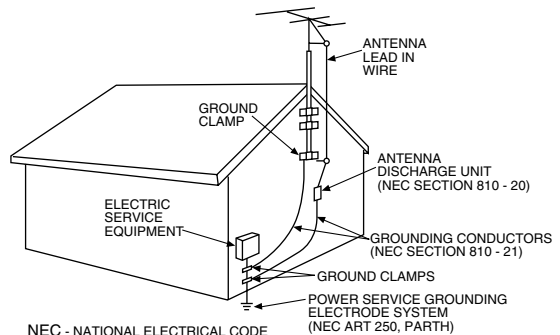
(1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Important Safeguards

- 1) Read Instructions — All the safety and operating instructions should be read before the unit is operated.
- 2) Retain Instructions — The safety and operating instructions should be retained for future reference.
- 3) Heed Warnings — All warnings on the unit and in the operating instructions should be adhered to.
- 4) Follow Instructions — All operating and maintenance instructions should be followed.
- 5) Cleaning — Unplug this video unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a dry cloth for cleaning.
- 6) Attachments — Do not use attachments not recommended by the video product manufacturer as they may be hazardous.
- 7) Water and Moisture — Do not use this video unit near water- for example near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.
- 8) Accessories — Do not place this video unit on an unstable cart, stand, tripod, bracket, or table. The video unit may fall, causing serious injury to a child or adult, and serious damage to the unit. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the video unit. Any mounting of the unit should follow the manufacturer's instructions and should use a mounting accessory recommended by the manufacturer. An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.
- 9) Ventilation — Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the video unit and to protect it from overheating. These openings must not be blocked or covered. Never place the video unit on a bed, sofa, rug, or other similar surface, or near or over a radiator or heat register. This video unit should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
- 10) Power Sources — This video unit should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your appliance dealer or local power company. For video units intended to be operated from battery power, or other sources, refer to the operating instructions.



- 11) Grounding or Polarization — This video unit may be equipped with either a polarized 2-wire AC (Alternating Current) line plug (a plug having one blade wider than the other) or 3-wire grounding type plug, a plug having a third (grounding) pin.
The 2-wire polarized plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug still fails to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug.
The 3-wire grounding type plug will fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding type plug.
- 12) Power-Cord Protection — Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords of plugs, convenience receptacles, and the point where they exit from the unit.
- 13) Outdoor Antenna Grounding — If an outside antenna or cable system is connected to the video unit, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Part 1 of the Canadian Electrical Code, in USA Section 810 of the National Electrical Code, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead in wire to an antenna discharge unit, size of grounding conductors, location of antenna discharge unit, connection to grounding electrodes, and requirements for the grounding electrode.



- 14) Lightning — For added protection of this video unit receiver during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the video unit that may be caused by lightning and power-line surges.
- 15) Power Lines — An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching such power lines or circuits as contact with them might be fatal.
- 16) Overloading — Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

Important Safeguards

- 17) Objects and Liquids — Never push objects of any kind into this video unit through openings as they may touch dangerous voltage points or short out parts that could result in a fire or electric shock. Never spill liquid of any kind onto the video unit.
- 18) Servicing — Do not attempt to service this video unit yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.
- 19) Damage Requiring Service — Unplug this video unit from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - a. When the power-supply cord or plug is damaged.
 - b. If any liquid has been spilled into, or objects have fallen onto, the video unit.
 - c. If the video unit has been exposed to rain or water.
 - d. If the video unit does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions, as an improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video unit to its normal operation.
 - e. If the video unit has been dropped or the cabinet has been damaged.
 - f. When the video unit exhibits a distinct change in performance — this indicates a need for service.
- 20) Replacement Parts — When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock or other hazards.
- 21) Safety Check — Upon completion of any service or repairs to this video unit, ask the service technician to perform safety checks to determine that the video unit is in safe operating order.

Precautions

USE & LOCATION

- **TO AVOID SHOCK HAZARD...** Your Camera/Recorder and power supply should not be exposed to rain or moisture. Do not connect the power supply or operate your Camera/Recorder if it gets wet. Your Camera/Recorder has been designed for outdoor use, however it is not designed to sustain direct exposure to water, rain, sleet, snow, sand, dust, or a direct splashing from a pool or even a cup of coffee. This action could permanently damage the internal parts of your Camera/Recorder. Do not attempt to disassemble this unit. There are no user serviceable parts inside. Unplug your Camera/Recorder from the power supply before cleaning.
- **DO NOT AIM YOUR CAMERA/RECORDER AT THE SUN OR OTHER BRIGHT OBJECTS.**
- **DO NOT LEAVE THE CAMERA/RECORDER WITH THE EVF AIMED DIRECTLY AT THE SUN AS THIS MAY CAUSE DAMAGE TO THE INTERNAL PARTS OF THE EVF.**
- **DO NOT EXPOSE YOUR CAMERA/RECORDER TO EXTENDED HIGH TEMPERATURE ...** Such as, in direct sunlight, inside a closed car, next to a heater, etc... This action could permanently damage the internal parts of your Camera/Recorder.
- **AVOID SUDDEN CHANGES IN TEMPERATURE ...** If the unit is suddenly moved from a cold place to a warm place, moisture may form on the tape and inside the unit.
- **DO NOT LEAVE YOUR CAMERA/RECORDER OR THE POWER SUPPLY TURNED ON WHEN NOT IN USE.**
- **STORAGE OF YOUR CAMERA/RECORDER ...** Store and handle your Camera/Recorder in a manner that will not subject it to unnecessary movement (avoid shaking and striking). Your Camera/Recorder contains a sensitive pick-up device which could be damaged by improper handling or storage.

CARE

- **TO CLEAN YOUR CAMERA/RECORDER...** Do not use strong or abrasive detergents when cleaning your Camera/Recorder body.
- **TO PROTECT THE LENS...** Do not touch the surface of the lens with your hand. Use a commercial Camera/Recorder lens solution and lens paper when cleaning the lens. Improper cleaning can scratch the lens coating.
- **TO PROTECT THE FINISH OF YOUR CAMERA/RECORDER...** Before handling your Camera/Recorder, make sure your hands and face are free from any chemical products, such as suntan lotion, as it may damage the finish.

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Standard Accessories

Illustrated on the left are accessories packaged with the Camera/Recorder.

1) AC Adaptor, DC Cable and AC Cable (→ 12)

- Supplies power to the Camera/Recorder.

CAUTION:

This unit will operate on 110/120/220/240V AC. An AC plug adaptor may be required for voltages other than 120V AC. Please contact either a local or foreign electrical parts distributor for assistance in selecting an alternate AC plug. We recommend using the accessory power plug adaptor in an area which has special AC outlets.

2) Battery Pack (→ 12)

- Supplies power to the Camera/Recorder.

3) Remote Controller and Button-Type Battery (→ 10, 11)

4) Lens Cap and Lens Cap Cord (→ 13)

5) A/V Cable (→ 33, 41)

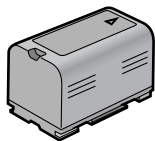
6) ND Filter (→ 51)

7) Shoulder Strap (→ 13)

1)



2)



VSB0419

3)



N2QAEC000003

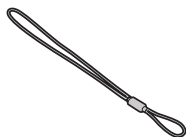


CR2025

4)



VFC3580



5)



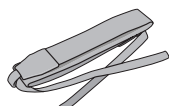
K2KC4CB00002

6)



VYQ2281

7)



VFC3506

Quick Guide

1 Charge the Battery. (→ 12)

- Connect the AC Cable to the AC Adaptor and AC Jack.
- Attach the Battery to the AC Adaptor. (This will start the charging process.)
- When the Charge Lamp [CHARGE] goes off, the Battery is fully charged.
- Since the Battery will not be charged when the DC Cable is connected to the AC Adaptor, disconnect it.

2 Attach the Charged Battery to the Camera/Recorder. (→ 12)

- Attach the battery after tilting the Viewfinder upward.

3 Turn the Camera/Recorder on. (→ 14)

- Slide the ① Switch to [ON]. (The [CAMERA] Lamp lights up.)

4 Insert the Cassette. (→ 13)

- Slide the ② Lever to the right and pull down to open the Cassette compartment cover.
- Insert the Cassette.
- Press the [PUSH/TO CLOSE] ③ to load the Cassette.
- Close the lower compartment Cover.

5 Start recording. (→ 20)

- Press the ④ Button. (Recording starts.)
- Press the ④ Button again to pause the recording.

To watch the Playback Picture

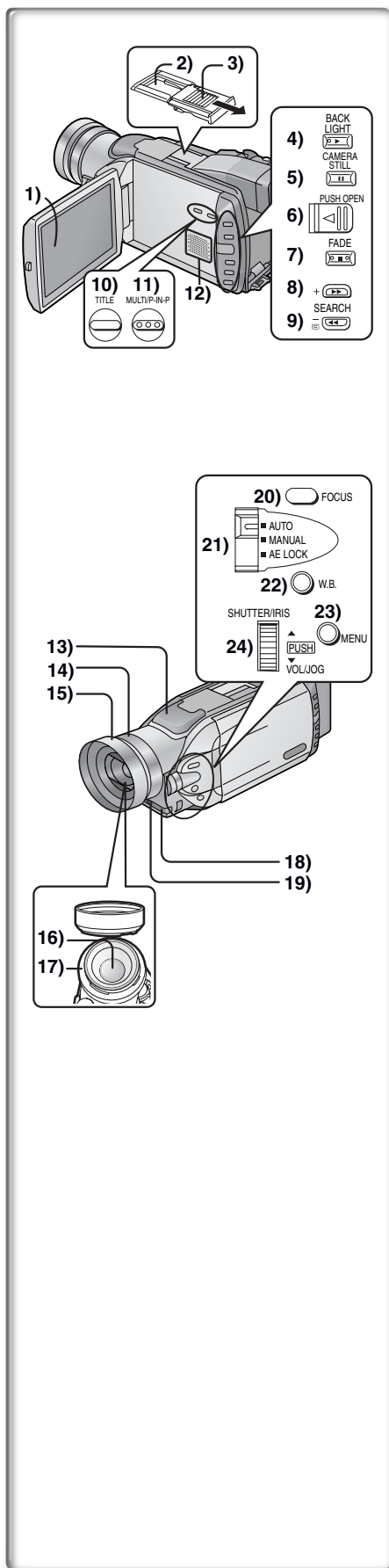
6 Switch to the VCR Mode, rewind the tape, and play the tape back. (→ 28)

- Slide the ⑤ Switch. (The [VCR] Lamp lights up.)
- Press the ⑥ Button.
- Press the ⑦ Button. (This will start playback.)

7 Turn the Camera/Recorder off. (→ 14)

- Set the ⑧ Switch to [OFF].

Controls and Components



1) LCD Monitor (→ 14, 51)

•Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the LCD Monitor screen. However, this is not a malfunction and does not affect the recorded picture.

2) Accessory Shoe

•Accessories, such as a stereo microphone (not supplied), are attached here.

3) Shoe Cover

4) Backlight Button [BACK LIGHT] (→ 23)

Play Button [▶] (→ 28, 29, 35)

5) Still Button [CAMERA STILL] (→ 21)

Pause Button [II] (→ 29, 35)

6) LCD Monitor Open Lever [PUSH OPEN] (→ 14)

7) Fade Button [FADE] (→ 22)

Stop Button [■] (→ 28, 29, 35)

8) Forward Search Button [+SEARCH] (→ 20)

Fast Forward/Cue Button [▶▶] (→ 28)

9) Reverse Search Button [-SEARCH] (→ 20)

Rewind/Review Button [◀◀] (→ 28)

Recording Check Button [G] (→ 20)

10) Title Button [TITLE] (→ 37)

11) Multi-Picture Button [MULTI] (→ 27, 32, 36, 37)

Picture-in-Picture Button [P-IN-P] (→ 27)

12) Speaker

13) Microphone (built-in, stereo)

14) Focus Ring (→ 23)

15) Lens Hood

•Always keep the Lens Hood attached to the Camera/Recorder so as to shut out unnecessary light.

16) Lens (LEICA DICOMAR)

•LEICA is a registered trademark of Leica microsystems IR GmbH and DICOMAR is a registered trademark of Leica Camera AG.

17) MC Protector (→ 51)

18) Remote Control Sensor (→ 11)

19) Tally Lamp (→ 20)

20) Focus Button [FOCUS] (→ 23)

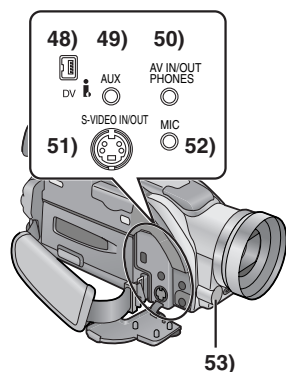
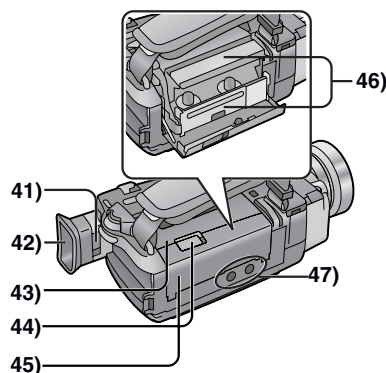
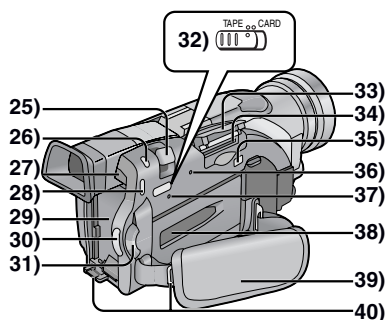
21) Mode Selector Switch [AUTO/MANUAL/AE LOCK]

(→ 20, 23, 24, 25)

22) White Balance Button [W.B.] (→ 25)

23) Menu Button [MENU] (→ 15)

24) Multi-Function Dial [PUSH] (→ 15, 19, 28, 29)



- 25) Zoom Lever [W/T] (→ 21, 22)
- 26) Photoshot Button [PHOTO SHOT] (→ 21, 34)
- 27) Battery Eject Button [BATT. EJECT] (→ 12)
- 28) Operation Mode Lamps [CAMERA/VCR/CARD P.B.] (→ 14, 20, 28, 35)
- 29) Battery Holder (→ 12)
- 30) Recording Start/Stop Button (→ 20)
- 31) Power Off/On Mode Selector Switch [OFF/ON/MODE] (→ 14)
- 32) Tape/Card Photoshot Selector [TAPE/CARD] (→ 21, 34)
- 33) Card Slot Cover (→ 34)
- 34) Card Slot (→ 34)
- 35) Card Slot Cover Open Lever [OPEN] (→ 34)
- 36) Card Access Lamp [ACCESS] (→ 34)
- 37) Reset Button [RESET] (→ 55)
- 38) Cassette Compartment Window (→ 13)
- 39) Grip Belt (→ 13)
- 40) Shoulder Strap Holders (→ 13)
- 41) Eyepiece Corrector Knob (→ 14)
- 42) Viewfinder (→ 14, 51)

• Due to limitations in LCD production technology, there may be some tiny bright or dark spots on the Viewfinder screen. However, this is not a malfunction and does not affect the recorded picture.

- 43) Upper Cassette Compartment Cover (→ 13)
- 44) Cassette Eject Lever [OPEN/EJECT] (→ 13)
- 45) Lower Cassette Compartment Cover (→ 13)
- 46) Cassette Holder (→ 13)
- 47) Tripod Receptacle (Tripod Mounting Hole)
 - Used for mounting the Camera/Recorder on an optional tripod.
- 48) DV Input/Output Terminal (i.LINK) [i.L.] (→ 42)
 - Connect this to the digital video equipment.
- 49) Auxiliary Terminal [AUX]
- 50) Audio-Video Input/Output Jack [AV IN/OUT] (→ 33, 41)
 - Headphone Jack [PHONES] (→ 48)
 - When a cable is connected to this jack, the built-in speaker of the Camera/Recorder is disabled.
- 51) S-Video Input/Output Jack [S-VIDEO IN/OUT] (→ 33, 41)
- 52) Microphone Jack [MIC] (→ 33, 48)
 - Connect with an external microphone or audio equipment. (When this jack is in use, the built-in microphone does not function.)
- 53) White Balance Sensor (→ 25, 52)

Remote Controller

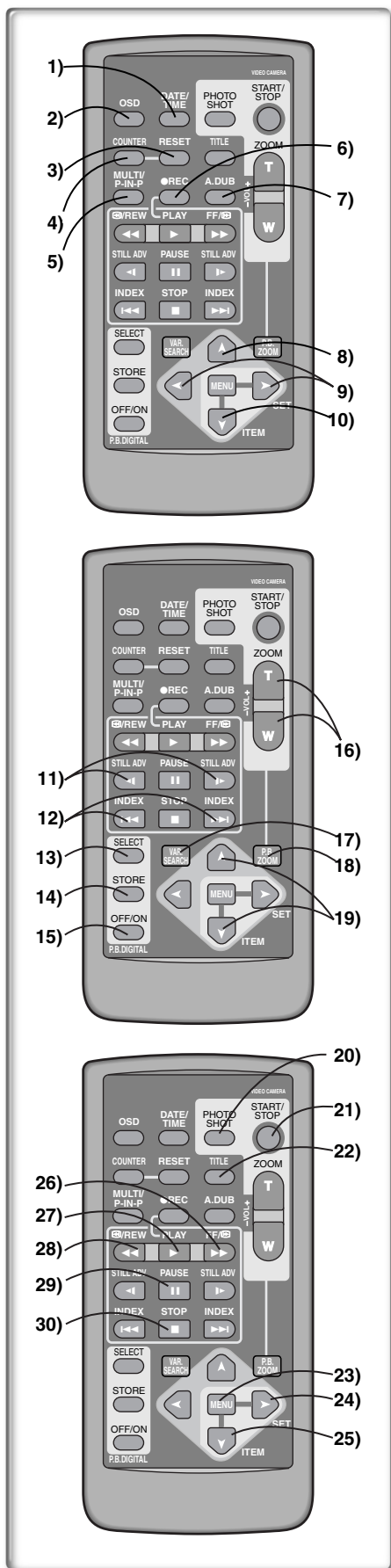
Using the wireless remote controller that is supplied with the Camera/Recorder, most of the Camera/Recorder functions can be operated from a distance.

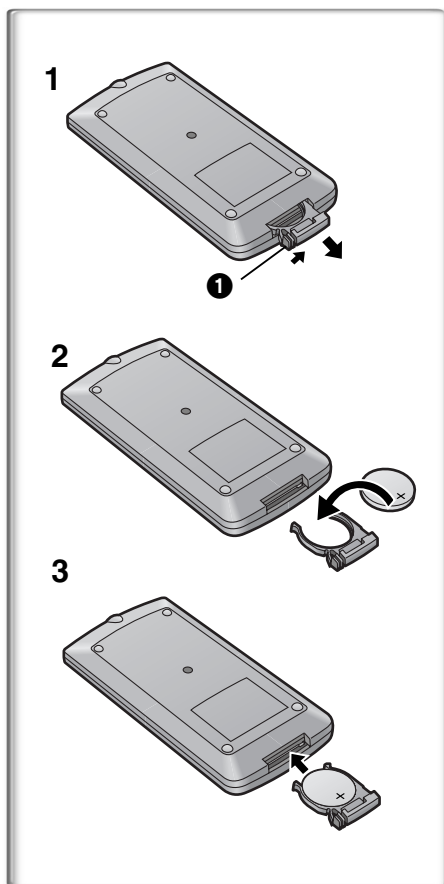
Remote Controller Buttons

- 1) Date and Time Button [DATE/TIME] (→ 45)
- 2) Indication Output Button [OSD] (On-Screen Display) (→ 33)
- 3) Counter Reset Button [RESET] (→ 52)
- 4) Indication Shift Button [COUNTER] (→ 45)
- 5) Multi-Picture/Picture-in-Picture Button [MULTI/P-IN-P] (→ 27, 32, 36, 37)
- 6) Recording Button [REC] (→ 41, 42)
- 7) Audio Dubbing Button [A.DUB] (→ 33)
- 8) Upward Direction Button [▲] (for Playback Zoom Function) (→ 31)
- 9) Left/Right Direction Buttons [◀, ▶] (for Playback Zoom Function) (→ 31)
- 10) Downward Direction Button [▼] (for Playback Zoom Function) (→ 31)
- 11) Slow Motion/Still Advance Buttons [◀, ▶] (◀: reverse direction, ▶: normal direction) (→ 29)
- 12) Index Search Buttons [◀◀, ▶▶] (◀◀: reverse direction, ▶▶: normal direction) (→ 30)
- 13) Selection Button [SELECT] (→ 31)
- 14) Store Button [STORE] (→ 31)
- 15) Off/On Button [OFF/ON] (→ 31)
- 16) Zoom/Volume Button [ZOOM/VOL] (→ 21, 22, 28, 31)
- 17) Variable Speed Search Button [VAR.SEARCH] (→ 28)
- 18) Playback Zoom Button [P.B. ZOOM] (→ 31)
- 19) Speed Selection Buttons [▲, ▼] (for variable speed search function) (→ 28)

The following buttons function in the same manner as the corresponding buttons on the Camera/Recorder.

- 20) Photoshot Button [PHOTO SHOT] (→ 21, 34)
- 21) Recording Start/Stop Button [START/STOP] (→ 20)
- 22) Title Button [TITLE] (→ 37)
- 23) Menu Button [MENU] (→ 15)
- 24) Item set Button [SET] (→ 15)
- 25) Item select Button [ITEM] (→ 15)
- 26) Fast-forward/Cue Button [▶▶] (→ 28)
- 27) Play Button [▶] (→ 28, 29, 35)
- 28) Rewind/Review Button [◀◀] (→ 28)
- 29) Pause Button [⏸] (→ 29, 35)
- 30) Stop Button [■] (→ 28, 29, 35)





■ Inserting a Button-type Battery

Before using the remote controller, insert the supplied button-type battery.

- 1 While pressing the Stopper ①, pull out the Battery Holder.**
- 2 Insert the button-type battery with the imprint (+) facing upward.**
- 3 Insert the Battery Holder into the Remote Controller.**

- When the button-type battery becomes weak, replace it with a new CR2025 battery. (A battery is normally expected to last about one year. However, it depends on operation frequency.)
- Make sure to match the poles properly when inserting the battery.

Warning

Danger of explosion if battery is incorrectly replaced.

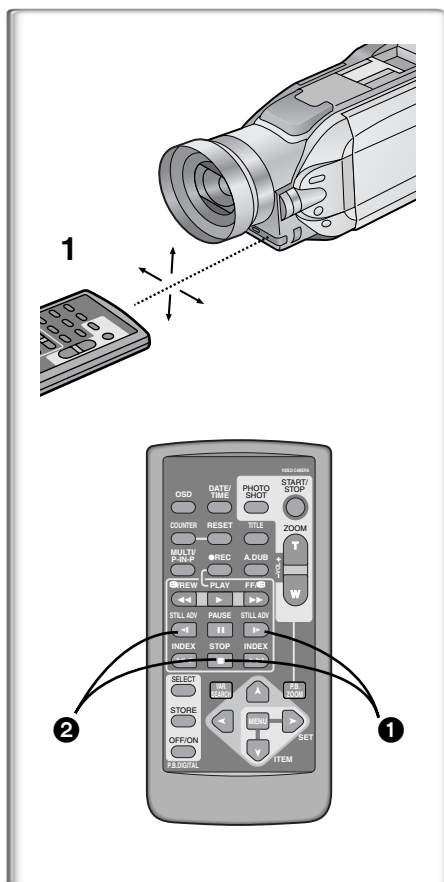
Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

Risk of fire, explosion and burns. Do not recharge, disassemble, heat above 212°F (100°C) or incinerate. Keep the Button-Type battery out of the reach of children. Never put Button-Type battery in mouth. If swallowed call your doctor.

Replace battery with CR2025 only. Use of another battery may present a risk of fire or explosion.

Caution-Battery may explode if mistreated.

Dispose of used battery promptly. Keep away from children. Do not recharge, disassemble or dispose of in fire.



■ Using the Remote Controller

- 1 Direct the Remote Controller to the Remote Control Sensor on the Camera/Recorder and press the desired button.**

- Distance from the Camera/Recorder: Within Approximately 15 feet (5 meters)
- Angle: Approximately 15 degrees in the vertical and horizontal directions from the central axis

- The above operating ranges are for indoor use. Outdoors or under strong light, the equipment may not operate properly even within the above ranges.
- Within 3 feet (1 meter) range, you can also use the Remote Controller on the side (the LCD Monitor side) of the Camera/Recorder.

Selecting Remote Controller Modes

When 2 Camera/Recorders are used simultaneously, they can be operated individually by selecting different Remote Controller Modes.

- If the Remote Controller Mode on the Camera/Recorder and Remote Controller do not match, [REMOTE] is displayed.

Setting on the Camera/Recorder:

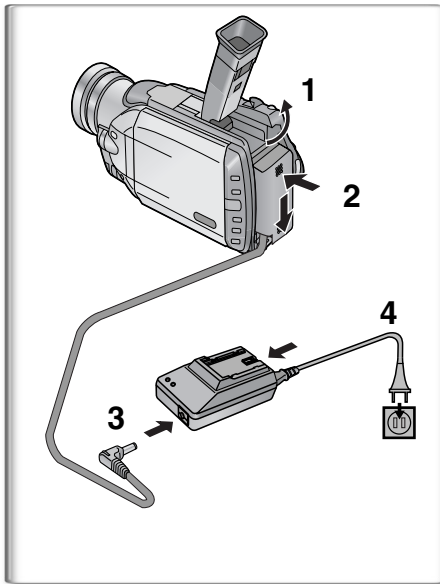
Set [REMOTE] on the [OTHER FUNCTIONS] Sub-Menu to the desired Remote Controller Mode.

Setting on the Remote Controller:

[VCR1]: Press the [▶] Button and [■] Button simultaneously. ①

[VCR2]: Press the [◀] Button and [■] Button simultaneously. ②

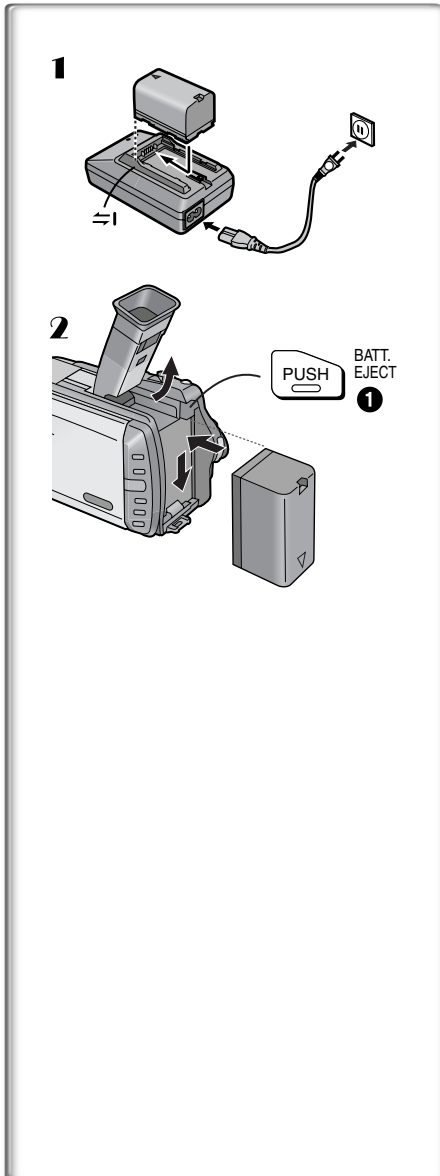
- When the battery in the Remote Controller is replaced, the Mode is automatically reset to [VCR1] Mode.



Power Supply

■ Using the AC Adaptor

- 1 Slide the Viewfinder backward and then tilt it upward.
- 2 Insert the battery-shaped connector of the DC Cable into the Battery Holder on the Camera/Recorder.
- 3 Connect the DC connector plug to the [DC OUT] Jack on the AC Adaptor.
- 4 Connect the AC Adaptor and AC Cable.



■ Using the Battery

- Before use, fully charge the battery.
- 1 **Attach the Battery to the AC Adaptor and charge it.**
 - Since the Battery will not be charged when the DC Cable is connected to the AC Adaptor, disconnect it.
 - The [CHARGE] Lamp lights up, and charging starts.
 - When the [CHARGE] Lamp goes off, charging is completed.
 - 2 **Attach the charged Battery to the Camera/Recorder.**

Disconnecting the Power Source

Set the [OFF/ON/MODE] Switch to [OFF] and, while pressing the [BATT. EJECT] Button ①, slide the Battery or DC Cable upward to disconnect it.

- For other notes, see page 46.





Charging Time and Available Recording Time

Ⓐ Charging Time

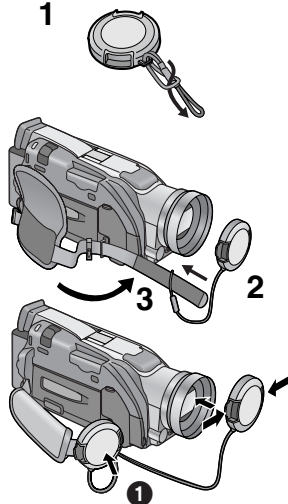
Ⓑ Maximum Continuous Recording Time

- "1 h 20 min." indicates 1 hour and 20 minutes.
- Battery VSB0419 is supplied.

- The hours shown in the table below are approximate hours. The numeric characters in parentheses indicate the recording time when the LCD monitor is used. In actual use, the available recording time may be shorter in some cases.
- The hours shown in the table below are for continuous recording at a temperature of 68°F (20°C) and humidity of 60 %. If the Battery is charged at a higher or lower temperature, the charging time may become longer.

CGR-D08A/1B 	Ⓐ	1 h.
	Ⓑ	1 h 10 min. (55 min.)
VSB0419 CGR-D16A/1B 	Ⓐ	2 h.
	Ⓑ	2 h 25 min. (2 h.)
CGP-D28A/1B 	Ⓐ	3 h 15 min.
	Ⓑ	4 h 15 min. (3 h 35 min.)
CGR-D53A/1K 	Ⓐ	5 h 20 min.
	Ⓑ	8 h. (6 h 40 min.)

1



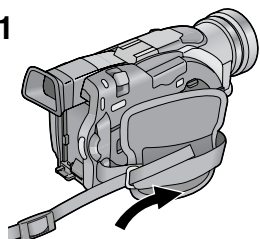
Lens Cap and Grip Belt

To protect the Lens surface, attach the Lens Cap. Adjust the length of the Grip Belt to the size of your hand.

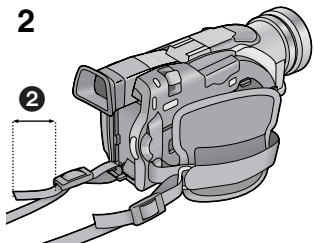
- 1 Attach the longer loop of the Lens Cap Cord to the Lens Cap.**
- 2 Attach the shorter loop to the Grip Belt.**
- 3 Put your hand through the Grip Belt and adjust the length.**

•The removed Lens Cap can be hooked onto the Grip Belt **1**. (When you are not recording, be sure to keep the Lens Cap attached to the Lens for protection.)

1



2



~~~~~ Attaching the Shoulder Strap

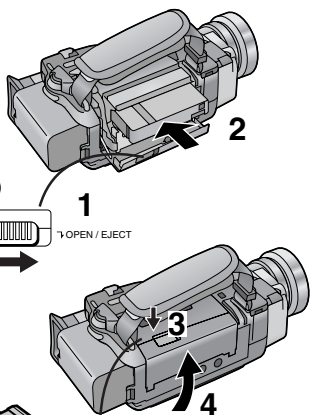
We recommend that you attach the Shoulder Strap before going outdoors to record so as to avoid dropping the Camera/Recorder.

- 1 Pass the tip of the Shoulder Strap through the Shoulder Strap Holder on the Camera/Recorder and pull the Shoulder Strap.**
- 2 Fold the tip of the Shoulder Strap, pass it through the Shoulder Strap Length Adjuster, and pull it.**

•Pull it out more than 1 inch (2 cm) **2** from the Shoulder Strap Length Adjuster so that it cannot slip off.

3

1 OPEN / EJECT



~~~~~ Inserting a Cassette

When power is supplied to the Camera/Recorder, the cassette can be taken out without turning the Camera/Recorder on.

- 1 Slide the [OPEN/EJECT] Lever **3** to the right and pull down to open the Cassette Compartment.**
- 2 Insert a Cassette.**
- 3 Close the Cassette Compartment and lock the Cassette Compartment by pressing the [PUSH TO CLOSE] mark.**
- 4 Close the Lower Cassette Compartment Cover.**

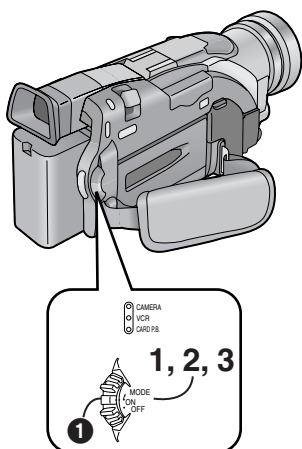
•For other notes, see page 46.

■ Accidental Erasure Prevention

Opening the accidental erasure prevention slider **4** on the cassette (by sliding it in the [SAVE] arrow direction) prevents recording. To enable recording, close the accidental erasure protection slider (by sliding it in the [REC] arrow direction).

Turning on/off the Camera/Recorder and selecting Modes

Turn on the power first and then select Modes.



How to Turn on the Power

- 1 Set the [OFF/ON/MODE] Switch to [ON] while pressing the center Button 1.

- The [CAMERA] Lamp lights up.

How to Switch Modes

- 2 Slide the [OFF/ON/MODE] Switch.

- With each slide of the Switch, the Mode switches in the order of Camera Mode, VCR Mode, and Card Playback Mode.

- The appropriate Mode Lamp lights up.

How to Turn off the Power

- 3 Set the [OFF/ON/MODE] Switch to [OFF] while pressing the center Button 1.

~~~~~ Using the Viewfinder

Before using the Viewfinder, adjust the field of view so that the displays inside the Viewfinder become clear and easy to read.

- 1 Slide the Viewfinder backward and then tilt it upward.

- The Viewfinder angle is adjusted upward.

- 2 Adjust by sliding the Eyepiece Corrector Knob 1.

Using the LCD Monitor

With the LCD Monitor open, you can also record the picture while watching it.

- 1 Turn the [OFF/ON/MODE] Switch to [ON].

- 2 Slide the [PUSH OPEN] Lever and, at the same time, bring out the LCD Monitor about 90° in the direction of the arrow.

- The Viewfinder goes off.

- 3 Adjust the LCD Monitor angle according to the desired recording angle.

- The LCD Monitor can rotate a maximum of 180° 2 from the vertical position to the upward direction and a maximum of 90° 3 to the downward direction. Forcefully rotating the LCD monitor beyond these ranges will damage the Camera/Recorder.

Closing the LCD monitor

Push the LCD Monitor until the [PUSH OPEN] Lever is securely locked.

Adjusting Brightness and Color Level

When [LCD/EVF SET] on the [DISPLAY SETUP] Sub-menu is set to [YES], the following items are displayed. (→ 15)

LCD Brightness [LCD BRIGHTNESS]

Adjusts the brightness of the image on the LCD screen.

LCD Color Level [LCD COLOR]

Adjusts the color saturation of the image on the LCD screen.

Brightness of the Viewfinder [EVF BRIGHTNESS]

Adjust the brightness of the image in the Viewfinder.

- 1 Press the [PUSH] Dial and select the item you want to adjust.

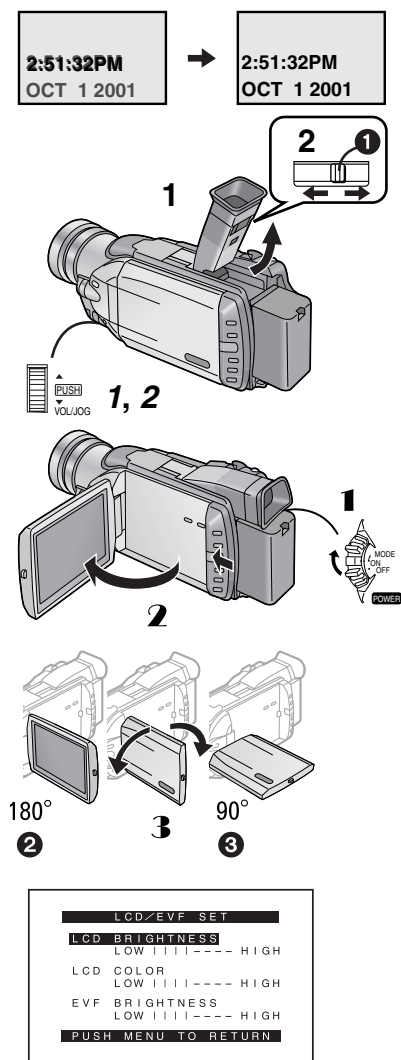
- 2 Rotate the [PUSH] Dial and increase or decrease the number of the vertical bars on the Bar Indication.

- The Bar Indication has 8 steps. A larger number of vertical bars indicates stronger brightness or color saturation.

Increasing the Brightness of the Entire LCD Monitor

Set the [LCD MODE] on the [DISPLAY SETUP] Sub-Menu to [BRIGHT].

- These adjustments do not affect the recorded images.



Using the Menu Screen

To facilitate the selection of a desired function or setting, this Camera/Recorder displays various function settings on menus.

1 Press the [MENU] Button.

- When the [CAMERA] Lamp is on, the Camera Function Menu is displayed. **1**
- When the [VCR] Lamp is on, the VCR Function Menu is displayed. **2**
- When the [CARD P.B.] Lamp is on, the Card Function Menu is displayed. **3**

2 Rotate the [PUSH] Dial to select a desired Sub-Menu.

- Rotate the [PUSH] dial to display the items highlighted.

3 Press the [PUSH] Dial to display the selected Sub-Menu.

4 Rotate the [PUSH] Dial to select the item to be set.

5 Press the [PUSH] Dial to set the selected item to a desired Mode.

- Each press of the cursor [►] brings up a subsequent Mode. Menu items that cannot be used in combination with the selected item are displayed in dark blue.

- While a Menu is displayed, you cannot record or play back. Menus can be displayed during playback but not during recording.

- The above operations can be carried out using the Remote Controller. (→ 10)

- To display the Menu, press the [MENU] Button **4** on the Remote Controller.

- To select items on the Menu, press the [ITEM] Button **5** on the Remote Controller.

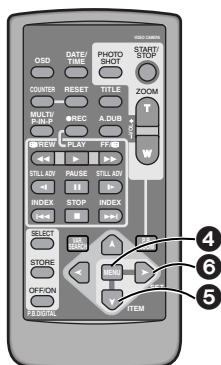
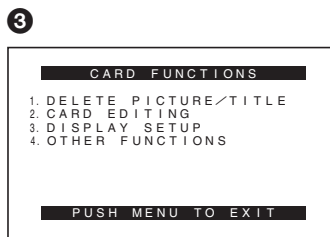
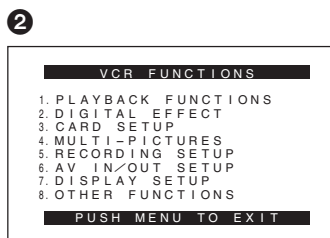
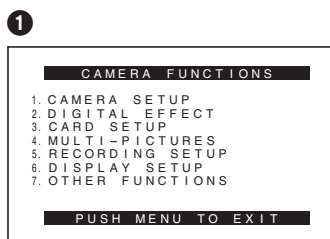
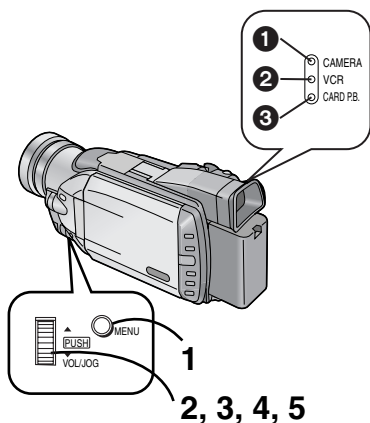
- To set the mode for the selected items, press the [SET] Button **6** on the Remote Controller.

To Exit the Menu Screen

Press the [MENU] Button again.

About the Menu Mode Setting

The setting selected on the Menu will be retained even when the Camera/Recorder is turned off. However, if the Battery or AC Adaptor is disconnected before turning the Camera/Recorder off, the selected setting may not be retained.



List of Menus

The illustrations of the Menus are for explanation purposes only, and they are different from the actual Menus.

Camera Mode Main-Menu [CAMERA FUNCTIONS]

[CAMERA SETUP] Sub-Menu

- 1) Auto Exposure Mode [PROG.AE] (→ 23)
- 2) Progressive Photoshot Mode [PROGRESSIVE] (→ 21)
- 3) Optical Image Stabilizer [EIS] (→ 22)
- 4) Digital Zoom [D.ZOOM] (→ 22)
- 5) Recording Mode [REC MODE] (→ 21)
- 6) Returning to the Main-Menu [RETURN]

[DIGITAL EFFECT] Sub-Menu

- 7) Digital Effects 1 [EFFECT1] (→ 26)
- 8) Digital Effects 2 [EFFECT2] (→ 26)

[CARD SETUP] Sub-Menu

- 9) Picture Size [PICTURE SIZE] (→ 34)
- 10) Picture Quality [REC MODE] (→ 34)
- 11) Card Low Brightness [LOW LIGHT SHOT] (→ 34)
- 12) Title Creation [CREATE TITLE] (→ 37)

[MULTI-PICTURES] Sub-Menu

- 13) Multi-Picture Mode [SCAN MODE] (→ 27)
- 14) Strobe Multi-Picture Speed [SPEED] (→ 27)
- 15) Swing Mode [SWING] (→ 27)
- 16) Position of Small Picture inside Normal Picture [P-IN-P] (→ 27)

[RECORDING SETUP] Sub-Menu

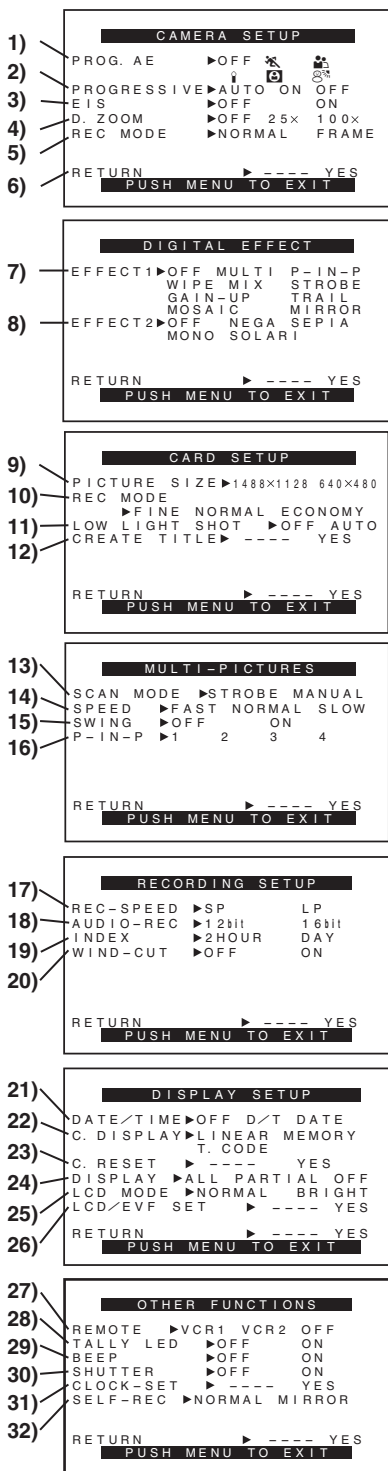
- 17) Recording Speed Mode [REC-SPEED] (→ 19)
- 18) Audio Recording Mode [AUDIO-REC] (→ 19, 33)
- 19) Index Mode [INDEX] (→ 30)
- 20) Wind Noise Reduction [WIND-CUT]
 - If this function is set to [ON], the sound of wind hitting the microphone can be reduced for recording.

[DISPLAY SETUP] Sub-Menu

- 21) Date and Time Indication [DATE/TIME] (→ 45)
- 22) Counter Display Mode [C.DISPLAY] (→ 45)
- 23) Counter Reset [C.RESET] (→ 52)
 - Set the counter value to zero. However, it cannot reset the Time Code.
- 24) Display Mode [DISPLAY] (→ 45)
- 25) LCD Brightness [LCD MODE] (→ 14)
- 26) LCD and Viewfinder Adjustment [LCD/EVF SET] (→ 14)

[OTHER FUNCTIONS] Sub-Menu

- 27) Remote Controller Mode [REMOTE] (→ 11)
- 28) Recording Lamp [TALLY LED] (→ 20)
- 29) Beep Sound [BEEP]
 - 1 Beep
 - When you start recording
 - When you switch the [OFF/ON/MODE] Switch from [OFF] to [ON]
 - 2 Beeps
 - When you pause recording
 - 10 Beeps
 - If you perform a wrong operation before or during recording
- 30) Shutter Sound Effect [SHUTTER] (→ 21)
- 31) Date and Time Setting [CLOCK-SET] (→ 19)
- 32) Self-Recording [SELF-REC] (→ 20)



VCR Mode Main-Menu [VCR FUNCTIONS]

[PLAYBACK FUNCTIONS] Sub-Menu

- 1) Blank Search [BLANK SEARCH] (→ 29)
- 2) Recording to Card [RECORD TO CARD] (→ 35)
- 3) Index Search Mode [INDEX] (→ 30)
- 4) Audio Output Mode [AUDIO] (→ 33)
- 5) Audio Selector [AUDIO OUT] (→ 48)
- 6) Returning to the Main-Menu [RETURN]

[DIGITAL EFFECT] Sub-Menu

- 7) Digital Effect On/Off [EFFECT] (→ 31, 32)
- 8) Digital Effect Selection [EFFECT SELECT] (→ 31, 32)

[CARD SETUP] Sub-Menu

- 9) Picture Quality [REC MODE] (→ 34)
- 10) Title Creation [CREATE TITLE] (→ 37)

[MULTI-PICTURES] Sub-Menu

- 11) Multi-Picture Mode [SCAN MODE] (→ 32)
- 12) Strobe Multi-Picture Speed [SPEED] (→ 32)
- 13) Swing Mode [SWING] (→ 32)

[RECORDING SETUP] Sub-Menu

- 14) Recording Speed Mode [REC-SPEED] (→ 19, 41, 42)
- 15) Audio Recording Mode [AUDIO-REC] (→ 19, 33)

[AV IN/OUT SETUP] Sub-Menu

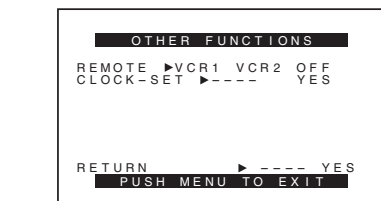
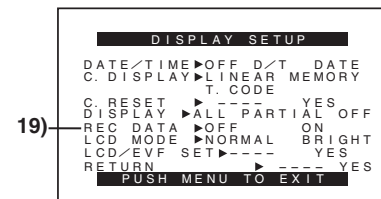
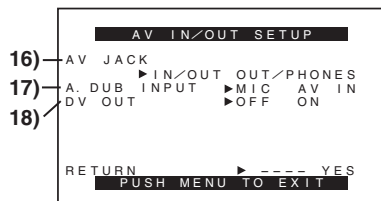
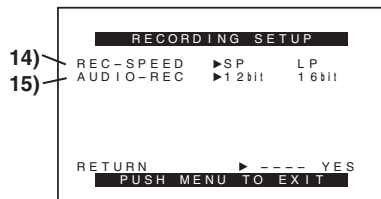
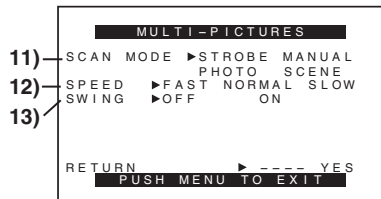
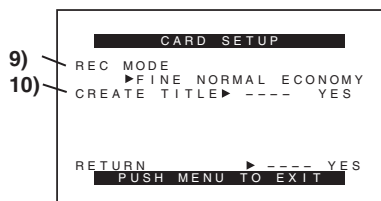
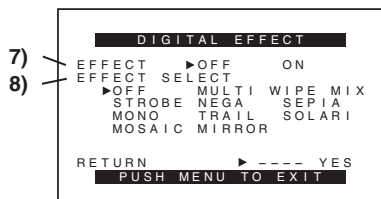
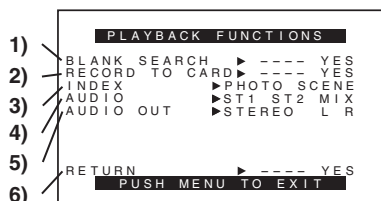
- 16) AV Jack [AV JACK] (→ 33, 41, 48)
- 17) Audio Dubbing Input [A.DUB INPUT] (→ 33)
- 18) AD Conversion Output [DV OUT] (→ 41)

[DISPLAY SETUP] Sub-Menu (→ 16)

- 19) Camera Data [REC DATA]
 - If you set [REC DATA] to [ON], the settings (shutter speed, iris (→ 47) and white balance settings (→ 47), etc.) used during the recordings are displayed during playback. [---] appears on the display when there is no data.
 - The setting information may not displayed properly if the camera data of this Camera/Recorder is played back on other equipment.
- The camera data will not be recorded in the following cases:**
- When the data is recorded from a card to a tape.
 - When recording proceeds with no input signals supplied.
 - When recording involves the use of the S-Video or AV Input Jack.
 - When pictures with no camera data are recorded using the DV Terminal.
 - When displaying a list of titles.

[OTHER FUNCTIONS] Sub-Menu

- Same as described on page 16.



Card Playback Mode Main-Menu

[DELETE PICTURE/TITLE] Sub-Menu

- 1) Selecting and deleting a Picture [DELETE PICTURE BY SELECTION] (→ 38)
- 2) Deleting All Pictures [DELETE ALL PICTURES] (→ 38)
- 3) Selecting and Deleting a Title [DELETE TITLE BY SELECTION] (→ 38)

[CARD EDITING] Sub-Menu

- 4) Recording to Cassette [RECORD TO TAPE] (→ 36)
- 5) Searching a Picture [PICTURE SEARCH] (→ 36)
- 6) Setting the File Lock [FILE LOCK] (→ 38)
- 7) Setting DPOF [DPOF SETTING] (→ 39)
- 8) Formatting a Card [CARD FORMAT] (→ 39)

[DISPLAY SETUP] Sub-Menu

- Same as described on page 16.

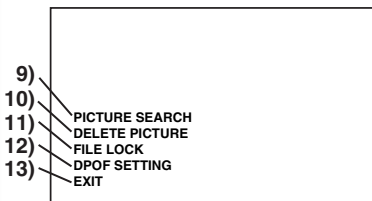
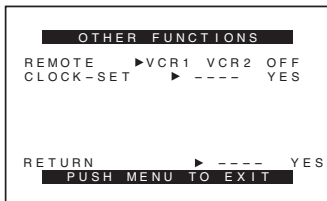
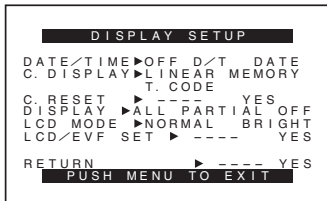
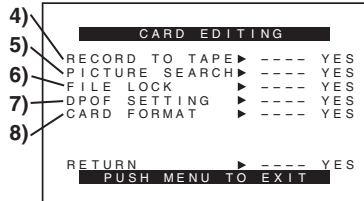
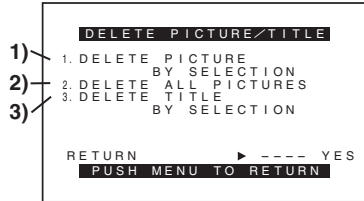
[OTHER FUNCTIONS] Sub-Menu

- Same as described on page 16.

Card Playback Mode Short-Cut Menu

Short-cut menus enable some of the Card Playback Mode menus to be called quickly. Press the [PUSH] Dial to display the short-cut menus, and rotate the [PUSH] Dial and then press it to select the desired menu.

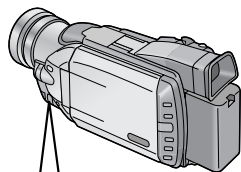
- 9) [PICTURE SEARCH]:
The [PICTURE SEARCH] menu for searching pictures from numbers appears.
- 10) [DELETE PICTURE]:
The [DELETE PICTURE] menu for erasing the displayed picture appears. Use this menu after the picture to be erased has appeared.
- 11) [FILE LOCK]:
The [FILE LOCK] menu to prevent the accidental erasure of the displayed picture (lock setting) appears. Use this menu after the picture to be locked has appeared.
- 12) [DPOF SETTING]:
The [DPOF SETTING] menu for performing the DPOF settings for the displayed picture appears. Use this menu after the picture whose DPOF settings are to be performed has appeared.
- 13) [EXIT]: This is for exiting from the short-cut menu.



CLOCK-SET

YEAR : 2001
 MONTH : OCT
 DAY : 10
 HOUR : 2 PM
 MINUTE : 30

PUSH MENU TO RETURN



MENU 1, 3
 PUSH 1, 2

Setting Date and Time

- 1 Press the [MENU] Button and rotate the [PUSH] Dial to select [OTHER FUNCTIONS] >> [CLOCK-SET] >> [YES].
- 2 Rotate and press the [PUSH] Dial to select [YEAR]/[MONTH]/[DAY]/[HOUR]/[MINUTE] and set it to a desired value.
 - Year will cycle in the order shown below.
 2000 → 2001 → ... → 2089 → 2000 → ...
- 3 Press the [MENU] Button to finish setting the date and time.
 - The clock operation starts from [00] seconds.
 - The menu will disappear when the button is pressed again.

• It is possible that the built-in clock in the Camera/Recorder may become inaccurate. Please check the time before recording. If the [⌚] Indication is flashing, charge the internal lithium battery and reset the date and time.

Internal Lithium Battery Recharge

The internal lithium battery sustains the operation of the clock. When the [⌚] Indication is lit, the internal lithium battery is near exhaustion.

- 1 Connect the AC Adaptor to the Camera/Recorder with the power turned off and then connect to the AC Jack.
 - After charging for 4 hours, the built-in lithium battery can power the clock for approximately 3 months.

LP Mode

A desired recording speed can be selected with [REC-SPEED] on the [RECORDING SETUP] Sub-Menu. ①

If LP Mode is selected, the recording time becomes 1.5 times longer than that of SP Mode.

Although the image quality does not decrease with the LP Mode recording, mosaic-like noise patterns may appear on a playback image, or some functions may be restricted.

- The contents that are recorded in LP Mode are not completely compatible with other equipment.
- Audio Dubbing is not possible with LP Mode. (→ 33)

Audio Recording Mode

The sound quality of the recorded sound can be selected with [AUDIO-REC] on the [RECORDING SETUP] Sub-Menu. ②

High quality sound recording is possible with "16bit 48kHz 2 track" Mode. With the "12bit 32kHz 4 track" Mode, the original sound can be recorded on 2 tracks in stereo, while the other 2 tracks can be used for re-recording.

CAMERA FUNCTIONS

1. CAMERA SETUP
2. DIGITAL EFFECT
3. CARD SETUP
4. MULTI-PICTURES
5. RECORDING SETUP
6. DISPLAY SETUP
7. OTHER FUNCTIONS

PUSH MENU TO EXIT

①

RECORDING SETUP

REC-SPEED ▶ SP LP
 AUDIO-REC ▶ 12bit
 INDEX ▶ 2 HOUR
 WIND-CUT ▶ OFF

RETURN

PUSH MENU TO EXIT

②

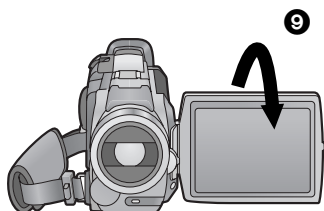
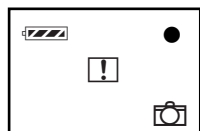
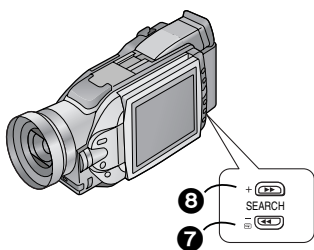
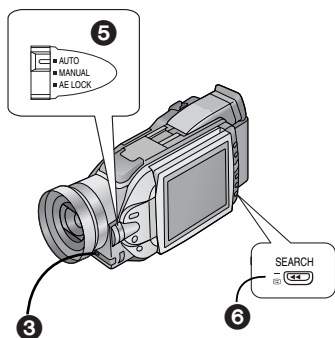
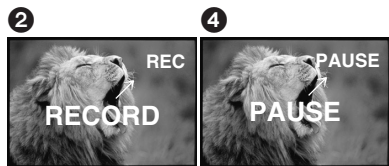
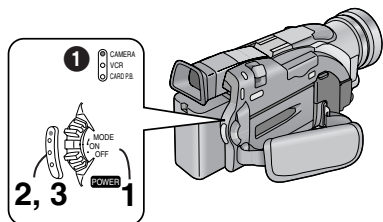
RECORDING SETUP

REC-SPEED ▶ SP 16bit
 AUDIO-REC ▶ 12bit 16bit
 INDEX ▶ 2 HOUR
 WIND-CUT ▶ OFF

RETURN

PUSH MENU TO EXIT

Recording



1 Set the [OFF/ON/MODE] Switch to [ON].

- The [CAMERA] Lamp lights up. ①

2 Press the Recording Start/Stop Button.

- Recording starts.
- After the [RECORD] is displayed, it changes to [REC]. ②
- The Tally Lamp (LED Lamp) ③ lights up during recording and alerts those being recorded that recording is in progress. The Tally Lamp does not light up if the [TALLY LED] on the [OTHER FUNCTIONS] Sub-menu is set to [OFF].

3 Press the Recording Start/Stop Button again to pause the recording.

- [PAUSE] is displayed. ④

- If the Recording Pause Mode continues for more than 5 minutes, the power is turned off automatically for tape protection and power conservation.

To resume recording from this condition, turn on the power again.

- When recording while the Mode Selector Switch is set to [AUTO] ⑤, the Camera/Recorder automatically adjusts the focus and white balance. (In some cases, they cannot be adjusted automatically and need to be adjusted manually.) (→ 23, 24, 25)

- For other notes, see page 46.

To Check the Recording

By pressing the [CHK] Button ⑥ in the Recording Pause Mode, you can play back the last few seconds of the recorded scene.

- [CHK] is displayed. After checking, the Camera/Recorder resumes the Recording Pause Mode.

- For other notes, see page 46.

To View the recorded scene while the Recording is paused (Camera Search)

The recorded scene can be viewed by holding down the [-SEARCH] Button ⑦ or [+SEARCH] Button ⑧ in the Recording Pause Mode.

The Camera Search function is useful for finding the starting point of a new scene to create a smooth transition from one scene to another.

- When the [-SEARCH] Button is pressed, pictures are played back in the reverse direction.
- When the [+SEARCH] Button is pressed, pictures are played back in the forward direction.

- For other notes, see page 46.

Self-Recording

By opening the LCD Monitor and turning it so that it faces forward (to the lens side) ⑨, you can let the subject in front of the Camera/Recorder monitor the shot while shooting is in progress.

- When the LCD Monitor is opened, the Viewfinder is disabled automatically. However, when the LCD Monitor is rotated forward, the image is also shown in the Viewfinder.

- If you prefer to have the image on the LCD Monitor to look like an image in a mirror, set [SELF-REC] on the [OTHER FUNCTIONS] Sub-Menu to [MIRROR]. (Mirror Mode)

Images are recorded normally and no left and right reversal occurs.

- If [MIRROR] is selected, only recording Indication [●], recording pause Indication [●], Card PhotoShot Indication [●] and Remaining Battery Power Indication [●] are displayed. If a general Warning/Alarm Indication [!] appears, return the LCD Monitor to the original position in order to check the specific content of the Warning/Alarm Indication.

To Finish the Recording

Set the [OFF/ON/MODE] Switch to [OFF].

PhotoShot Recording on the DV Cassette

With this function, you can record still pictures with sound for approximately 7 seconds each on the Cassette.

1 Slide the [TAPE/CARD] Selector to [TAPE].

2 Press the [PHOTO SHOT] Button in the Recording Pause Mode.

- The Camera/Recorder records a still picture for about 7 seconds and then switches back to the Recording Pause Mode.

- PhotoShot Recording results in slightly inferior image quality.

Progressive Photoshot

With the progressive Photoshot Function, you can record still pictures with higher resolution than with the normal Photoshot Function.

- After setting [PROGRESSIVE] on the [CAMERA SETUP] Sub-menu to [ON] or [AUTO], press the [PHOTO SHOT] Button in the Recording Pause Mode. [P] is displayed. **1**

- This Function may not work with some function settings. (→ 46)

Frame Moving Picture (Frame Mode)

Frame moving-picture recording makes it possible to obtain natural still pictures with a high picture quality, even when the scenes involve a lot of movement recording frame still pictures continuously at a rate of 30 frames a second. (It is also possible to record sound.)

- After setting [REC MODE] on the [CAMERA SETUP] Sub-menu to [FRAME], press the Recording Start/Stop Button.
- When [REC MODE] is set to [FRAME], the Digital Effect 1 Function ([EFFECT1] on the [DIGITAL EFFECT] Sub-menu) cannot be used.
- For normal recording set [REC MODE] to [NORMAL].

Continuous Photoshot

If the [PHOTO SHOT] Button is held down with the [SHUTTER] of the Sub-Menu [OTHER FUNCTIONS] set to [ON], the Camera/Recorder will record still images without interruptions every 0.7 seconds until the button is released.

- The screen blinks and, at the same time, a shutter clicking sound is recorded. (However, this function is not enabled when Progressive Photoshot is set to [ON] or [AUTO].)

Digital Still Picture

When the [CAMERA STILL] Button **2** is pressed, images become still pictures. When the Button is pressed again, the Digital Still Picture Mode is cancelled.

- We recommend that you press the [CAMERA STILL] Button first at the position where you want to record the picture and then press the [PHOTO SHOT] Button.

- For the still pictures taken in the Continuous Photoshot Mode or Digital Still Picture Mode, photoshot index signals are not recorded.

Zoom In/Out Functions

It gives special effects to the Camera/Recorder by Recording objects close by or with wide-angle shot.

1 For wide-angle shots (zoom out):

Press the [W/T] zoom lever towards [W].

For close-ups (zoom in):

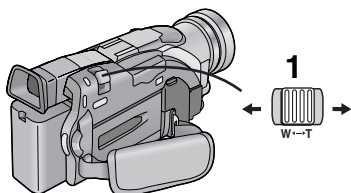
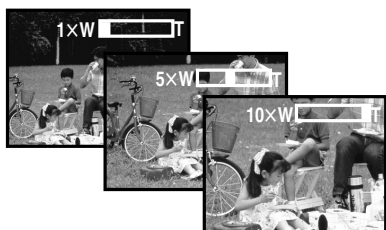
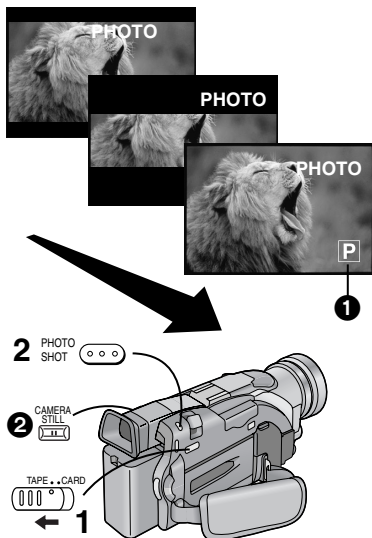
Press the [W/T] zoom lever towards [T].

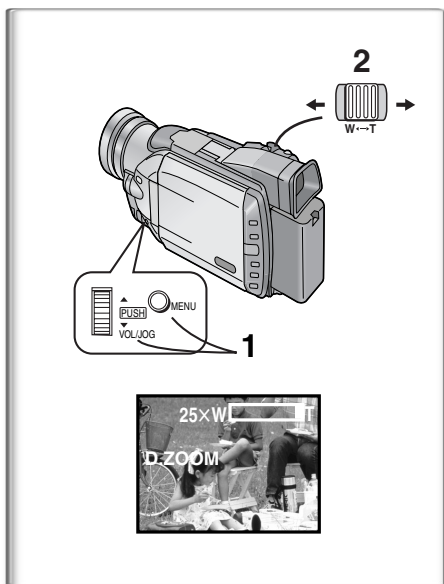
- Zoom magnification is displayed for a few seconds.
- Generally speaking, when the [W/T] zoom lever is pressed towards [W] or [T], the zooming speed gradually increases.

Taking Close-up Shots of Small Subjects (Macro Close-up Function)

When the zoom magnification is 1×, the Camera/Recorder can focus on a subject that is as close as approximately 1.5 inch (35 mm) from the lens. With this, small subjects like insects can be recorded.

- For other notes, see page 46.





Digital Zoom Function

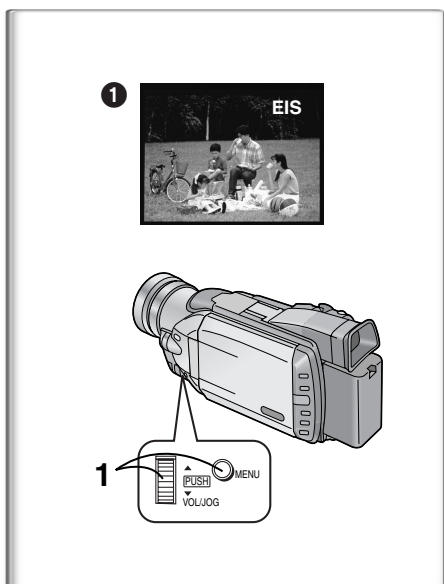
This function is useful when you want to record close-up shots of subjects located beyond a normal zoom range of 1X to 10X magnification. With the digital zoom function, you can select a magnification of 25 X or 100X.

- 1 Set [CAMERA FUNCTIONS] >> [CAMERA SETUP] >> [D.ZOOM] >> [25x] or [100x].
 - 25X: Digital zooming to 25X
 - 100X: Digital zooming to 100X
- 2 To zoom in or out, press the [W/T] zoom lever towards [W] or towards [T].
 - As the magnification of digital zooming increases, the quality of image may deteriorate.

Canceling the Digital Zoom Function

Set [D.ZOOM] on the [CAMERA SETUP] Sub-menu to [OFF].

- For other notes, see page 46.



Optical Image Stabilizer Function

If you are recording in unstable situations and the Camera/Recorder is shaky, you can use this function to correct the distortion in these images.

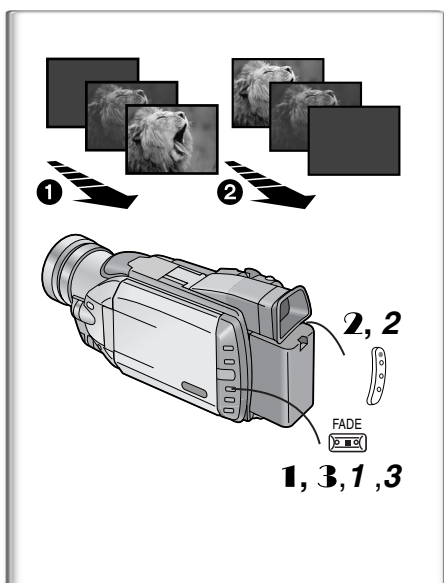
- If the Camera/Recorder shakes too much, this Function may not be able to stabilize images.

- 1 Set [CAMERA FUNCTIONS] >> [CAMERA SETUP] >> [EIS] >> [ON].
 - The [EIS] Indication ❶ appears.

Canceling Optical Image Stabilizer

Set [EIS] on the [CAMERA SETUP] Sub-Menu to [OFF].

- For other notes, see page 46.



Fade In/Out Functions

Fade In ❶

Fade In brings out images and sounds gradually from a black screen at the beginning of a scene.

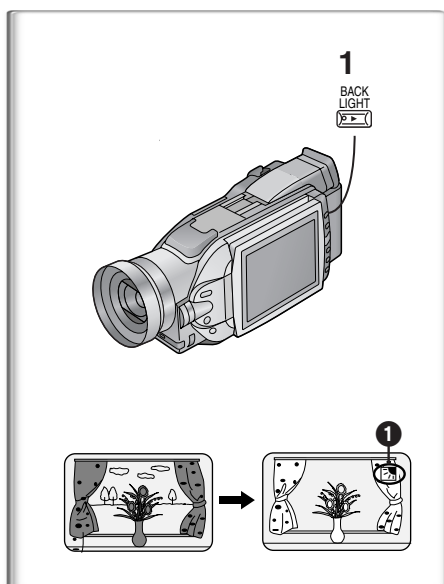
- 1 Hold down the [FADE] Button while the Camera/Recorder is set to the Recording Pause Mode.
 - The image fades out gradually.
- 2 When the image is completely gone, press the Recording Start/Stop Button to start recording.
- 3 Release the [FADE] Button about 3 seconds after starting recording.
 - The image reappears gradually.

Fade Out ❷

Fade Out causes images and sounds to disappear gradually, leaving a black screen at the end of a scene.

- 1 Hold down the [FADE] Button while recording.
 - The image fades out gradually.
- 2 About 3 seconds after the image is completely gone, press the Recording Start/Stop Button to stop recording.
- 3 Release the [FADE] Button.

- For other notes, see page 46.



Backlight Compensation Function

This prevents a recording subject from being recorded darker in backlight. (Backlight is the light that shines from behind a recording subject.)

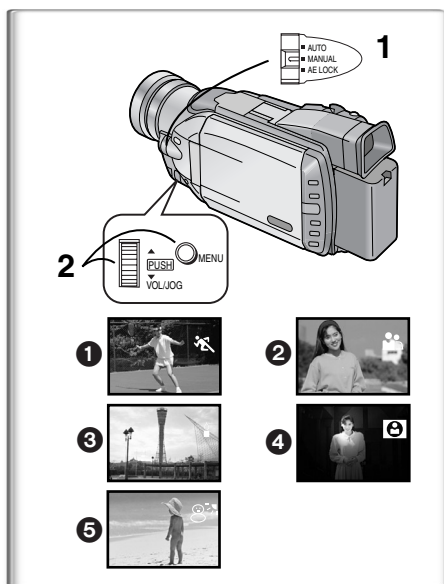
1 Press the [BACK LIGHT] Button.

- The [MNL] Indication ① flashes and then is displayed.

To resume normal Recording

Press the [BACK LIGHT] Button.

- When the [BACK LIGHT] Button is pressed, the entire screen becomes brighter.
- By operating the [OFF/ON/MODE] Switch, the Backlight Compensation Function is cancelled.



~~~~~ Recording in Special Situations (Program AE) ~~~~~

Select optimal automatic exposures under specific recording situations.

1 Set the Mode Selector Switch to [MANUAL].

- The [MNL] Indication appears.

2 Set [CAMERA FUNCTIONS] >> [CAMERA SETUP] >>

[PROG.AE] >> a desired Mode [], [], [], [], [].

- The Indication of the selected Mode is displayed.

[] Sports Mode ①

For Recording scenes involving quick movements, such as sports scenes.

[] Portrait Mode ②

Focuses on the main subject of the image and leaves the background slightly out of focus.

[] Low Light Mode ③

Preserves the mood of dim light settings without altering picture brightness.

[] Spotlight Mode ④

Neutralizes the additional brightness created by a spot light.

[] Surf & Snow Mode ⑤

Compensates for excessive illumination from sun glare to produce a clear picture.

Canceling the Program AE Function

Set [PROG.AE] on the [CAMERA SETUP] Sub-Menu to [OFF]. Or, set the Mode Selector Switch to [AUTO].

- For other notes, see page 46.

~~~~~ Manual Focus Adjustment ~~~~~

Focus can be adjusted manually for recording in a situation where auto focus may not function well.

1 Set the Mode Selector Switch to [MANUAL].

- The [MNL] Indication appears.

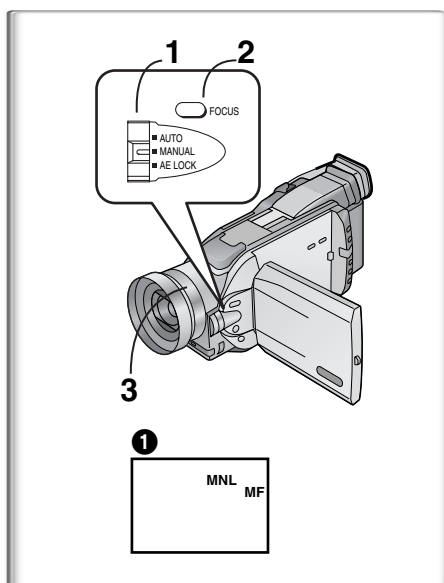
2 Press the [FOCUS] Button.

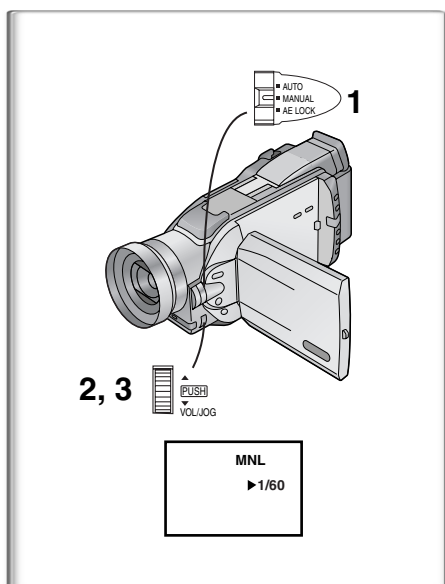
- The [MF] Indication (Manual Focus Mode) ① appears.

3 Rotate the Focus Ring to adjust the focus.

To Resume Automatic Adjustment

Press the [FOCUS] Button to turn off the [MF] Indication. Or, set the Mode Selector Switch to [AUTO].





Manual Shutter Speed Adjustment

Useful for Recording fast-moving subjects.

- 1 Set the Mode Selector Switch to [MANUAL].**
 - The [MNL] Indication appears.
- 2 Press the [PUSH] Dial repeatedly until the shutter speed display appears.**
- 3 Rotate the [PUSH] Dial to adjust the shutter speed.**

The Range of Shutter Speed Adjustment

1/60-1/8000 (or 1/60-1/500: for Card Photoshot Recording)

The standard shutter speed is 1/60.

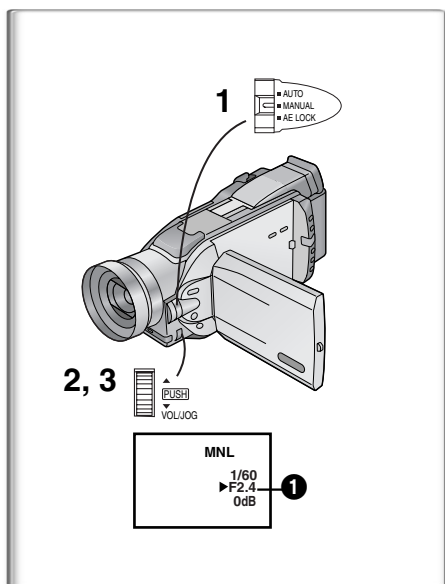
Selecting a speed closer to [1/8000] causes the shutter speed to be faster.

- When you are using progressive function or card photoshot recording, a speed only up to 1/500 can be used.

To Resume Automatic Adjustment

Set the Mode Selector Switch to [AUTO]. Or, Hold down the [PUSH] Dial.

- For other notes, see page 47.



Manual Iris Adjustment (F Number)

You can use this function when the screen is too bright or too dark.

- 1 Set the Mode Selector Switch to [MANUAL].**
 - The [MNL] Indication appears.
- 2 Press the [PUSH] Dial repeatedly until the Indication ❶ appears.**
- 3 Rotate the [PUSH] Dial to adjust the iris.**

Adjustable Range of the Iris

CLOSE (Closed)→F16...F1.7→

OPEN (Opened) 0dB→OPEN 3dB...→OPEN18dB

When a value closer to [CLOSE] is selected, the image becomes darker.

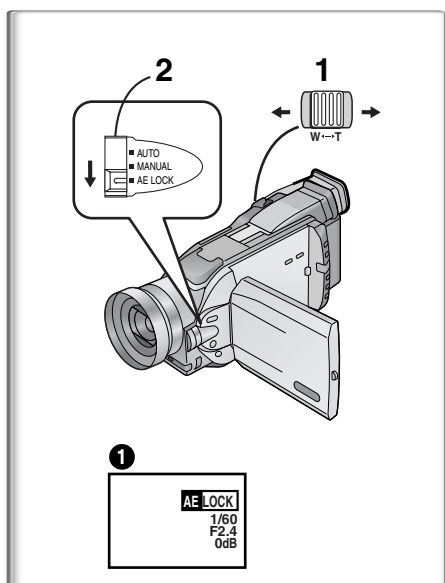
When a value closer to [OPEN18dB] is selected, the image becomes brighter.

The value to which [dB] is attached indicates a gain value. If this value is too large, the quality of the image deteriorates.

To Resume Automatic Adjustment

Set the Mode Selector Switch to [AUTO]. Or, Hold down the [PUSH] Dial.

- For other notes, see page 47.



Recording with a Fixed Brightness (AE Lock Function)

This is a function for setting a fixed brightness. When recording in light with an extreme difference in the brightness of the background and the subject, such as a person standing in front of a dark background, the person can be recorded brightly if the brightness is adjusted to the person.

- 1 After setting to Camera Mode, press the [W/T] zoom Lever toward [T] and zoom in to the part you want to record.**
- 2 Set the Mode Selector Switch to [AE LOCK].**

- The [AE LOCK] Indication ❶ flashes to indicate that the brightness is fixed. Afterwards, it lights up white.

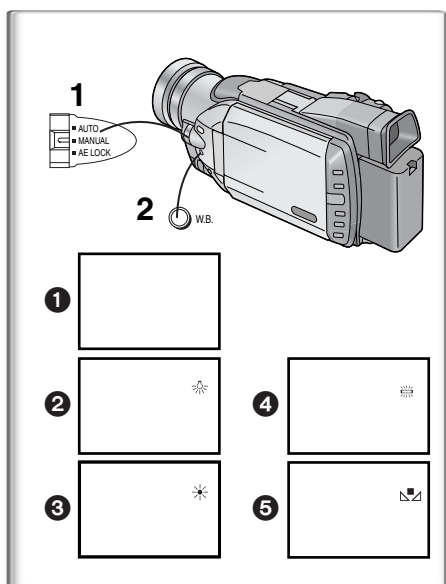
To fix your desired brightness

Set the Mode Selector Switch to [MANUAL] first and adjust the Shutter Speed and Iris to the desired color in step 2, and then set the Mode Selector Switch to [AE LOCK].

To cancel AE Lock Function

Set the Mode Selector Switch to [AUTO] or [MANUAL].

- Set the AE Lock again when [TAPE/CARD] Selector is switched after the AE Lock has been set. (The brightness setting may be changed.)



Recording in Natural Colors (White Balance)

Depending on the scene or lighting conditions, the Automatic White Balance Adjustment Mode may not be able to bring out natural colors. In such a case, the white balance can be adjusted manually.

1 Set the Mode Selector Switch to [MANUAL].

- The [MNL] Indication appears.

2 Press the [W.B.] Button repeatedly to set a desired White Balance Mode.

- 1 Automatic White Balance Adjustment
- 2 Indoor Mode (shooting under incandescent lamp)
- 3 Outdoor Mode
- 4 Fluorescent light Mode
- 5 The White Balance setting that was previously set manually

To Resume Automatic Adjustment

Press the [W.B.] Button repeatedly until no Indication appears. Or, set the Mode Selector Switch to [AUTO].

- For other notes, see page 47.

~~~~~ Adjusting White Balance Manually

When the Auto White Balance Adjustment function does not operate under the existing light conditions, use the Manual White Balance Adjustment mode.

1 Set the Mode Selector Switch to [MANUAL].

- The [MNL] Indication appears.

2 Point the Camera/Recorder at a full-screen white subject, and then hold down the [W.B.] Button until the [MNL] Indication stops flashing.

- The [MNL] Indication appears after the screen has darkened for a moment.
- When the [MNL] Indication flashes after turning the Camera/Recorder on, the previously adjusted white balance setting is still kept.

To Resume Automatic Adjustment

Press the [W.B.] Button repeatedly until no Indication appears. Or, set the Mode Selector Switch to [AUTO].

About White Balance Sensor

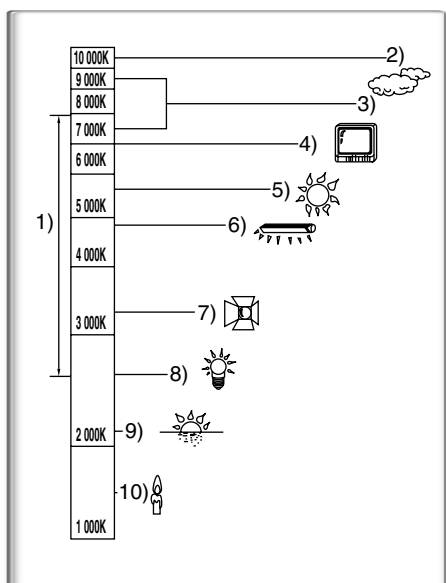
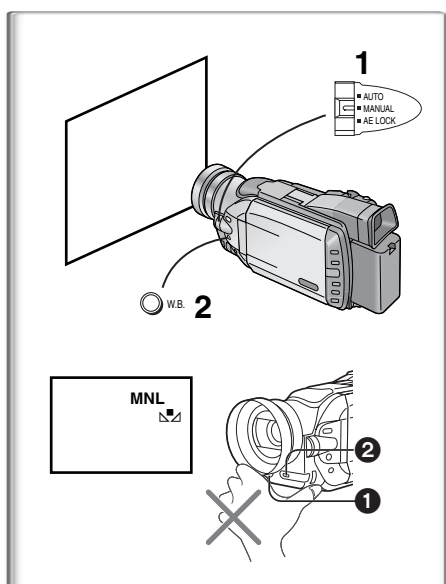
The White Balance Sensor ① determines the nature of the light source during recording.

- Do not cover the White Balance Sensor with your hand during recording. Otherwise, White Balance will not function normally.
- The red light from the Tally Lamp ② will be reflected off your hand or object, possibly causing the White Balance sensor to operate incorrectly and changing the coloring.

Use of Auto White Balance Adjustment in inappropriate lighting conditions may result in reddish or bluish images. Where the subject is found on the left but surrounded by many light-sources, Auto White Balance Adjustment may not operate properly. In such case we suggest that you adjust the White Balance.

- 1) The range that is controlled by the Auto White Balance Adjustment Mode of this Camera/Recorder
- 2) Blue sky
- 3) Cloudy sky (Rain)
- 4) TV screen
- 5) Sunlight
- 6) White fluorescent light
- 7) Halogen light bulb
- 8) Incandescent light bulb
- 9) Sunrise and sunset
- 10) Candlelight

- For other notes, see page 47.



1) MULTI



3) WIPE



5) STROBE



6) GAIN-UP



8) MOSAIC



10) NEGA



12) MONO



2) P-IN-P



4) MIX



7) TRAIL



9) MIRROR



11) SEPIA



13) SOLARI



Digital Effect Functions

This Camera/Recorder is equipped with digital effect Functions that add special effects to the scene.

Digital Effects 1 [EFFECT1]

- 1) [MULTI] Multi-Picture Mode
- 2) [P-IN-P] Picture-in-Picture Mode
- 3) [WIPE] Wipe Mode
- 4) [MIX] Mix Mode
- 5) [STROBE] Strobe Mode
 - It records images with a stroboscopic effect.
- 6) [GAIN-UP] Gain-up Mode
 - It brightens images electronically.
 - Adjust focus manually when using this Mode.
- 7) [TRAIL] Trailing Effect Mode
 - It records images with a trailing effect.
- 8) [MOSAIC] Mosaic Mode
 - It produces a mosaic-like image.
- 9) [MIRROR] Mirror Mode
 - The right half of an image becomes a mirror image of the left half.

Digital Effects 2 [EFFECT2]

- 10) [NEGA] Negative Mode
 - The colors of the recorded image are inverted as seen in a negative.
- 11) [SEPIA] Sepia Mode
 - It records a scene with a brownish tint, like the color of old pictures.
- 12) [MONO] Black&White Mode
 - It records an image in black and white.
- 13) [SOLARI] Solarization Mode
 - It records an image with a painting-like effect.

Selecting a desired digital effect

Set [CAMERA FUNCTIONS] >> [DIGITAL EFFECT] >> [EFFECT1] or [EFFECT2] >> a desired digital effect.

Canceling the digital effect

Set [CAMERA FUNCTIONS] >> [DIGITAL EFFECT] >> [EFFECT1] or [EFFECT2] >> [OFF].

• For other notes, see page 47.

~~~~~ Wipe Mode and Mix Mode

Wipe Mode:

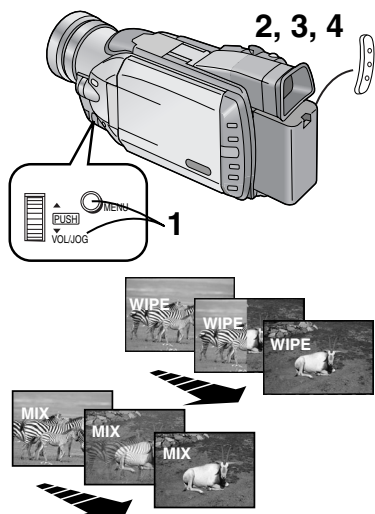
Like a curtain is being pulled, the still picture of the last recorded scene gradually changes to the moving image of a new scene.

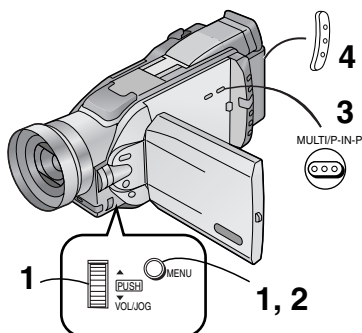
Mix Mode:

While the moving image of a new scene fades in, the still image of the last recorded scene gradually fades out.

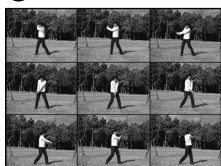
- 1 Set [DIGITAL EFFECT] >> [EFFECT1] >> [WIPE] or [MIX].
 - The [WIPE] or [MIX] Indication appears.
- 2 Press the Recording Start/Stop Button to start the Recording.
- 3 Press the Recording Start/Stop Button to pause the Recording.
 - The last scene is stored in memory. The [WIPE] or [MIX] Indication changes to [WIPE] or [MIX].
- 4 Press the Recording Start/Stop Button to restart the Recording.
 - The last image of the previous scene gradually changes to the new scene.

• For other notes, see page 47.





①



②



Multi-Picture Mode

Strobe Multi-Picture Mode ①:

You can capture and record 9 consecutive small still pictures.

Manual Multi-Picture Mode ②:

You can manually capture and record 9 small still pictures.

After setting [DIGITAL EFFECT] >> [EFFECT1] >> [MULTI].....

1 Set [MULTI-PICTURES] >> [SCAN MODE] >> [STROBE] or [MANUAL].

When [STROBE] is selected:

- Set the [SPEED] to a desired strobe speed.

[FAST]: You can capture 9 consecutive still pictures within approximately 1 second

[NORMAL]: You can capture 9 consecutive still pictures within approximately 1.5 seconds

[SLOW]: You can capture 9 consecutive still pictures within approximately 2 seconds

- If you set [SWING] on the [MULTI-PICTURES] Sub-Menu to [ON], the intervals at which the 9 still pictures are taken are longer at the beginning and end than in the middle of the swing strobe period, and it is useful for analyzing swing motion, etc., in sports.

When [MANUAL] is selected:

- You can select a desired scene one at a time up to 9 small pictures.

2 Exit the menu by pressing the [MENU] Button.

3 Press the [MULTI] Button.

- If [MANUAL] is selected, press the [MULTI] Button at each scene you want to capture.

4 Press the Recording Start/Stop Button or the [PHOTOSHOT] Button to record on the Cassette.

Deleting all the captured Multi pictures

While 9 multi-pictures are displayed, press the [MULTI] Button.

- If [MANUAL] has been selected, press the [MULTI] Button after 9 pictures are displayed.

To Display the Multi Pictures again

Press the [MULTI] Button for 1 second or longer.

To Delete Multi pictures one by one

(When pictures were captured in [MANUAL])

When the [MULTI] Button is pressed for 1 second or longer while the still pictures are displayed, the picture captured last is deleted. If you keep pressing the [MULTI] Button, the pictures are deleted continuously.

- After still pictures are deleted one by one, they cannot be displayed again.

- For other notes, see page 47.

Picture-in-Picture Mode

You can display a sub-screen (still picture) inside the screen.

After setting [DIGITAL EFFECT] >> [EFFECT1] >> [P-IN-P].....

1 Select [P-IN-P] on the [MULTI-PICTURES] Sub-Menu and set the position (①②③④) where you want to insert a small still picture.

2 Exit the menu by pressing the [MENU] Button.

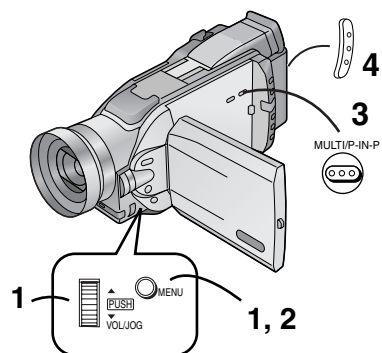
3 Aim the Camera/Recorder at the scene you want to capture and press the [P-IN-P] Button to insert a small still picture.

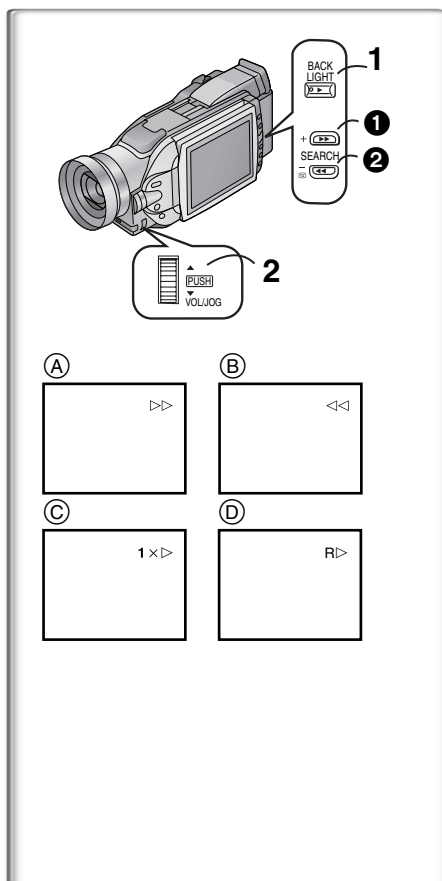
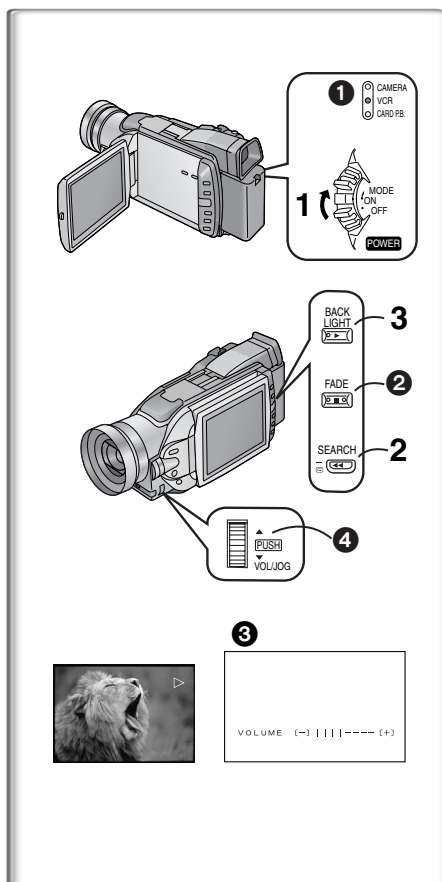
- A small still picture is displayed in a Normal picture.

- If the [P-IN-P] Button is pressed again, the small still picture is cleared.

4 Press the Recording Start/Stop Button or the [PHOTOSHOT] Button to record on the Cassette.

- For other notes, see page 47.





Playing Back

The recorded scene can be played back immediately after recording.

1 Slide the [OFF/ON/MODE] Switch and set the Camera/Recorder in the VCR Mode.

- The [VCR] Lamp lights up. ①

2 Press the [REWIND] Button to rewind the tape.

- Rewind the tape to the point where you want to start playback.
- When the tape reaches the beginning, rewinding stops automatically.

3 Press the [PLAY] Button to start playback.

To Stop Playback

Press the [STOP] Button ②.

- If a Cassette recorded with copyright protection signals is played back, the screen becomes blue or displays mosaic-like noise patterns.

Adjusting the Sound Volume

Until the [VOLUME] Indication ③ appears, keep pressing the [PUSH] Dial ④. Then, rotate the [PUSH] Dial to adjust the volume. After the adjustment, press the [PUSH] Dial to make the [VOLUME] Indication disappear. To adjust the volume with the Remote Controller, press the [T] or [W] Button to display the [VOLUME] Indication. Press the [T] Button to increase the volume or press the [W] Button to decrease the volume. The [VOLUME] Indication goes off 2 or 3 seconds after the adjustment is finished.

- When the Playback Zoom Function is in use, the sound volume cannot be adjusted.

- For other notes, see page 48.

Finding a Scene You Want to Play Back

Cue/Review Playback

Cue Playback ①

Keep the [F.F.] Button ① pressed during playback.

Review Playback ②

Keep the [R.W.] Button ② pressed during playback.

- For longer Cue or Review Playback, press the [F.F.] Button or the [R.W.] Button only briefly. As this locks the search function, you do not need to keep the button pressed for a long time.
- To resume normal playback, press the [PLAY] Button. During Cue and Review Playback, pictures with fast-moving subjects may contain mosaic-like noise patterns.

Hyper Check Function

If you press the [F.F.] Button during fast-forwarding of the tape or the [R.W.] Button during rewinding of the tape, Cue Playback or Review Playback continues for as long as the Button is held down.

Variable Speed Search Function

The speed of Cue or Review Playback can be varied.

1 During playback, press the [PLAY] Button.

- [1X] Indication appears. ③

2 Rotate the [PUSH] Dial and select a desired search speed.

The following 6 playback speeds are available for the Variable Speed Search Function in both the fast-forwarding and rewinding directions. 1/5 X (slow playback, SP mode only), 1/3 X (slow playback, LP mode only), 1 X, 2 X, 5 X, 10 X, and 20 X.

- The same setting can be performed using the Remote Controller's the [VAR.SEARCH] Button, the [▲] Button and the [▼] Button.

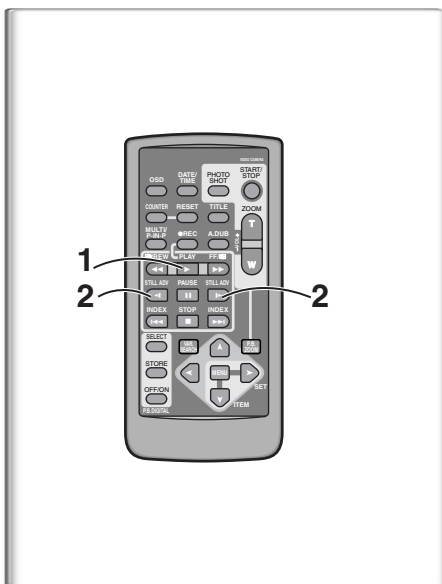
Resuming Normal Playback

Press the [PLAY] Button.

- During Cue or Review Playback, fast-moving images may show mosaic-like noise patterns.
- The sound is muted during search.

Repeat Playback

If you continue to press the [PLAY] Button for 5 seconds or longer, the Camera/Recorder switches to Repeat Playback Mode, and the [R ▷] Indication appears ④. (To cancel Repeat Playback Mode, set the [OFF/ON/MODE] Switch to [OFF].)



Slow Motion Playback

This Camera/Recorder can play back at a slow speed.

- 1 Press the [▶] Button.
- 2 Press the [◀] Button or the [▶] Button on the Remote Controller.

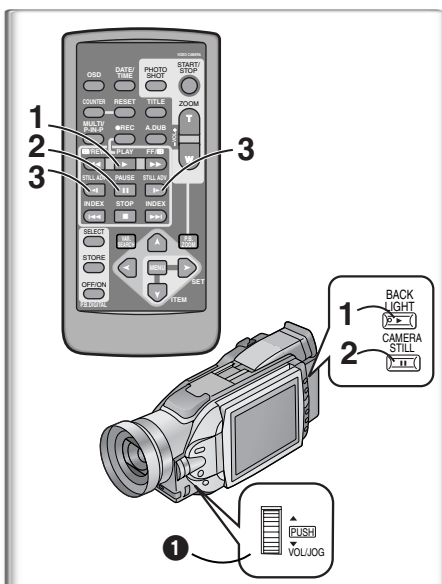
- When the [◀] Button is pressed, Slow Motion Playback proceeds in the reverse direction, while pressing the [▶] Button starts Slow Motion Playback in the forward direction.

Scenes recorded in the SP mode are played back at approximately 1/5th of the normal speed.

Scenes recorded in the LP mode are played back at approximately 1/3rd of the normal speed.

Resuming Normal Playback

Press the [▶] Button.



Still Playback/Still Advance Playback

This Camera/Recorder is capable of still picture playback and frame-advance playback.

- 1 Press the [▶] Button.
- 2 Press the [■] Button.
- 3 Press the [◀] Button or the [▶] Button on the Remote Controller.

- The playback picture stops in the Still Playback Mode.
- With each pressing of the [◀] Button, still pictures advance in the reverse direction. With each pressing of the [▶] Button, still pictures advances in the forward direction. If either one of the Buttons continues to be pressed, still pictures advance continuously one frame at a time until the Button is released.

Resuming Normal Playback

Press the [▶] Button or [■] Button.

Jog Playback

By rotating the Jog Dial ([PUSH] Dial) ① of the Camera/Recorder in the Still Playback Mode, still pictures can be advanced one frame at a time in the forward or backward direction.

- If the Camera/Recorder is left in the Still Playback Mode for more than 5 minutes, the Camera/Recorder switches to the Stop Mode to protect the video heads from excessive wear and tear.

Finding the End of Recording (Blank Search Function)

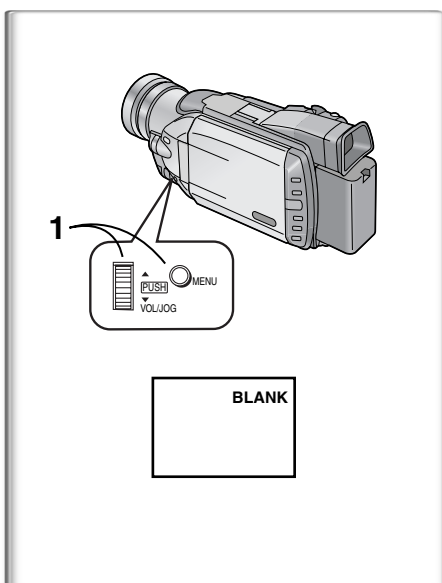
The Blank Search Function helps you to locate the end of the Recording on the Cassette quickly.

- 1 Set [VCR FUNCTIONS] >> [PLAYBACK FUNCTIONS] >> [BLANK SEARCH] >> [YES].

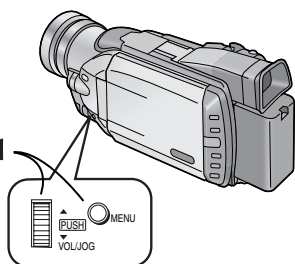
- The [BLANK] Indication appears.
- Approximately 1 second before the last recorded scene, the Camera/Recorder switches to the Still Playback Mode.
- If there is no blank portion left on the Cassette, the Camera/Recorder stops at the end of the tape.

Canceling Blank Search prior to completion

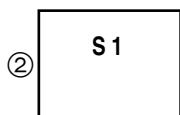
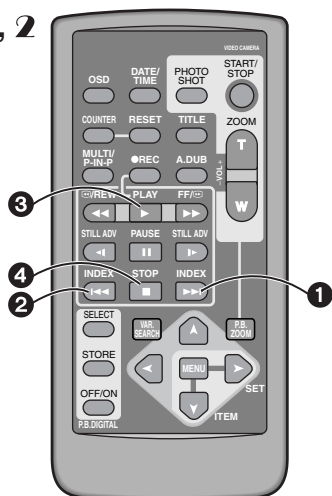
Press the [■] Button.



1, 1



2, 2



Index Search Functions

To facilitate searching of desired scene, this Camera/Recorder automatically records index signals during recording, as explained in the following.

Photoshot Index Signal

These signals are automatically recorded whenever still pictures are taken in Photoshot Mode (→ 21) or whenever you copy pictures on a Memory card to a cassette (→ 36).

When recording still pictures using the Continuous Photoshot Mode (→ 21), the index signal is not recorded.

Scene Index Signal

Scene Index Signals are automatically recorded when you start recording after inserting a Cassette.

However, if the Camera/Recorder is switched from the VCR Mode to Camera Mode or if the date and time are set before the start of recording, the index signal is not recorded.

- If [INDEX] of [RECORDING SETUP] Sub-Menu on the [CAMERA FUNCTIONS] Main-Menu is set to [2HOUR], an index signal is recorded when Recording is restarted after a lapse of 2 hours or longer. If it is set to [DAY], an index signal is recorded when recording is restarted after the date has changed since the last recording. (While the index signal is recorded, the [INDEX] Indication ① flashes for a few seconds.)

Photoshot Index Search

- 1 Set [VCR FUNCTIONS] >> [PLAYBACK FUNCTIONS] >> [INDEX] >> [PHOTO].
- 2 Press the [▶▶▶] Button ① or the [◀◀◀] Button ② on the Remote Controller.

- With each press of the corresponding button, still pictures recorded in Photoshot Mode are searched.
- After Pictures with Sounds are played back for 4 seconds, the Camera/Recorder switches to the Still Playback Mode.

Scene Index Search

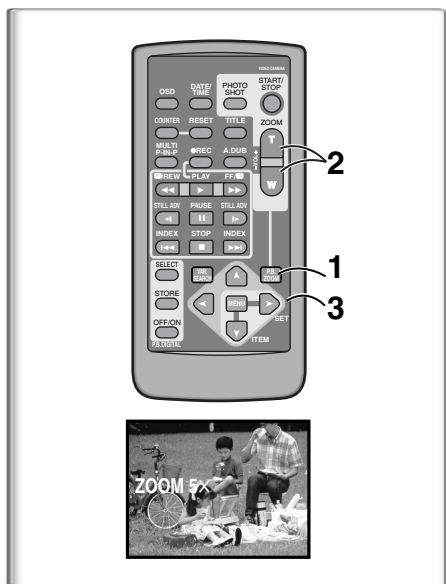
- 1 Set [VCR FUNCTIONS] >> [PLAYBACK FUNCTIONS] >> [INDEX] >> [SCENE].
- 2 Press the [▶▶▶] Button ① or the [◀◀◀] Button ② on the Remote Controller.

- When the corresponding Button is pressed once, the [S 1] Indication ② appears, and searching of the subsequent scene marked with an index signal starts. Each time the button is pressed after the start of Scene Index Search the indication changes from [S 2] to [S 9], and the beginning of the scene corresponding to the selected number will be searched. After reaching the desired scene, playback starts automatically.
- Up to 9 scene numbers can be selected.

Top Scan

If the [▶▶▶] Button or the [◀◀◀] Button is pressed for more than 2 seconds, the Camera/Recorder will scan for scenes (or PhotoShots) and playback the first few seconds of each. (To cancel, press the [▶] Button ③ or the [■] Button ④.)

- For other notes, see page 47.



Playback Zoom Function

A part of the image can be enlarged up to 10 times during playback.

- 1 During playback, press the [P.B. ZOOM] Button on the Remote Controller.

- The center of the image is enlarged to approximately double the size.

Changing the Zoom Magnification

- 2 Change the magnification by pressing the [W] or [T] Button on the Remote Controller.

- You can increase the magnification up to 10×.

Changing the enlarged area of an image

- 3 Press the Arrow Button (▲, ◀, ▶, ▼) on the Remote controller that points to the area you want to enlarge.

- When the playback is stopped, the position of the enlarged image area is reset to the center automatically.

Canceling the Playback Zooming Function

Press the [P.B.ZOOM] Button on the Remote Controller.

- For other notes, see page 47.

~~~~~ Playback Digital Effect Functions ~~~~~

During playback, special Digital Effects can be added to the Recording. The digital effects that may be applied in the process of recording (except Picture in Picture Mode) will be the same as these added effects.

- 1 Press the [▶] Button.

- 2 Press the [SELECT] Button of the Remote Controller and select desired Digital Effect.

- When the [SELECT] Button is pressed repeatedly, the Digital Effect selection changes.

MULTI → WIPE → MIX → STROBE → NEGA → SEPIA → MONO
→ TRAIL → SOLARI → MOSAIC → MIRROR

- The same setting can also be set using the [DIGITAL EFFECT] on the [VCR FUNCTIONS] Main-Menu.

Suspending Playback Digital Effect temporarily

Press the [OFF/ON] Button ① to clear or restart the digital effect. When the Digital effect is paused temporarily, the selected effect's indication flashes.

Canceling the Digital Effect

Press the [SELECT] Button on the Remote Controller repeatedly until the Digital Effect Indication is cleared.

- For other notes, see page 47.

■ Playback with Wipe Mode and Mix Mode ~~~~~

- 1 Press the [▶] Button to start playback.

- 2 Press the [SELECT] Button of the Remote Controller and select [WIPE] or [MIX].

- 3 Press the [STORE] Button at the moment you want to save as a still picture.

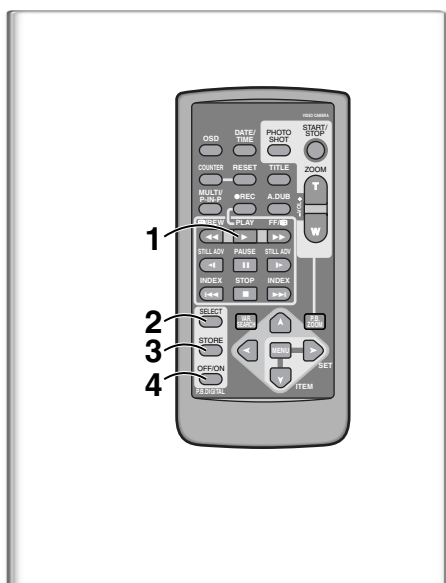
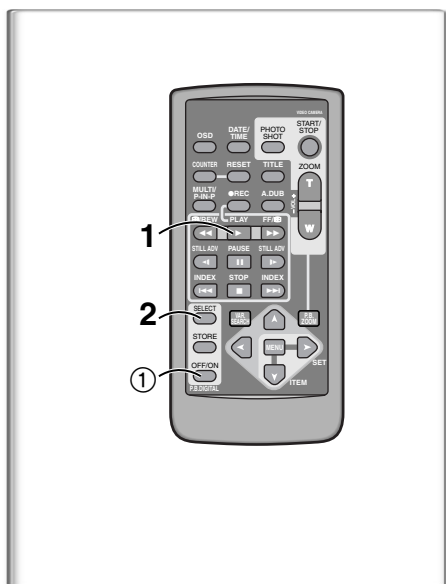
- The last scene is stored in memory. The [WIPE] or [MIX] Indication changes to [WIPE] or [MIX].

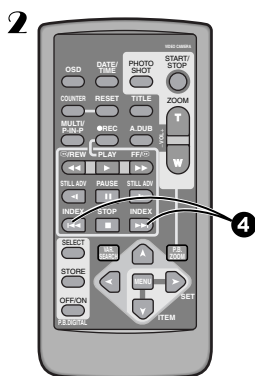
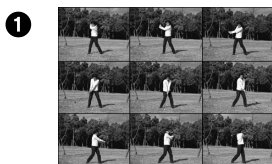
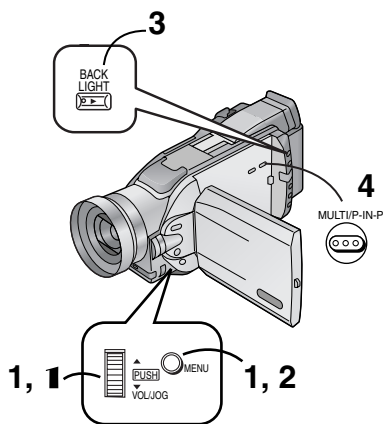
- 4 Press the [OFF/ON] Button in the scene in which you want to use the Wipe or Mix effect.

- The scene changes as a result of the Wipe or Mix effect.

- The Wipe Function and Mix Function can be used only from the Remote Controller during playback.

- If the [OFF/ON] Button is pressed while Wipe Function or Mix Function is used, the effect will stop temporarily at that point. Pressing the [OFF/ON] Button again will bring back the effect.





■ Playing Back with Multi-Picture Mode

Strobe Multi-Picture Mode [STROBE] ①:

You can capture 9 consecutive still pictures from playback video.

Manual Multi-Picture Mode [MANUAL] ②:

Selecting a desired still picture one at a time, you can capture 9 still pictures.

Index Multi-Picture Mode ([PHOTO], [SCENE]) ③:

You can capture 9 screens of pictures to which index signals have been attached.

After setting [EFFECT SELECT] on the [DIGITAL EFFECT] Sub-Menu to [MULTI].....

1 Set [MULTI-PICTURES] >> [SCAN MODE] >> [STROBE], [MANUAL], [PHOTO] or [SCENE], whichever mode you prefer.

When [STROBE] is selected:

• Set the [SPEED] to a desired strobe speed.

[FAST]: You can capture 9 consecutive still pictures within approximately 1 second

[NORMAL]: You can capture 9 consecutive still pictures within approximately 1.5 seconds

[SLOW]: You can capture 9 consecutive still pictures within approximately 2 seconds

• If you set [SWING] on the [MULTI-PICTURES] Sub-Menu to [ON], the intervals at which the 9 still pictures are taken are longer at the beginning and end than in the middle of the swing strobe period, and it is useful for analyzing swing motion, etc., in sports.

2 Exit the Menu by pressing the [MENU] Button.

3 Play back the tape.

• If you select Index mode, it is not necessary to play back the tape.

4 Press the [MULTI] Button.

• If [STROBE] is selected: 9 screens are automatically captured starting at the point which the Button is pressed.

• If [MANUAL] is selected: press the [MULTI] Button at each scene you want to capture. When 9 screens are captured, the tape will stop.

• If [PHOTO] or [SCENE] is selected: From the point at which the Button is pressed, 9 screens of pictures to which index signals are attached are captured in the playback direction. After 9 screens are captured, the tape will stop, but, if there are 8 or less pictures to be captured, the tape will stop at its end.

Deleting All the Captured Multi Pictures

While displaying the multi-pictures that have been captured, press the [MULTI] Button.

• If [MANUAL] has been selected, press [MULTI] Button after 9 screens are displayed.

To Display the Multi-pictures again

Press the [MULTI] Button for 1 second or longer.

To Delete Multi-pictures one by one

(When Pictures have been captured in Manual Mode)

When the [MULTI] Button is pressed for 1 second or longer while the still pictures are displayed, the picture that was captured last is deleted. If you continue to press the Button, the pictures are deleted consecutively.

• After still pictures are deleted one at a time, they cannot be displayed again.

To Stop Capturing Pictures midway (When Pictures have been captured in Index Mode)

Press the [■] Button.

To Search the tape position of a desired picture among the playback pictures displayed on 9 screens

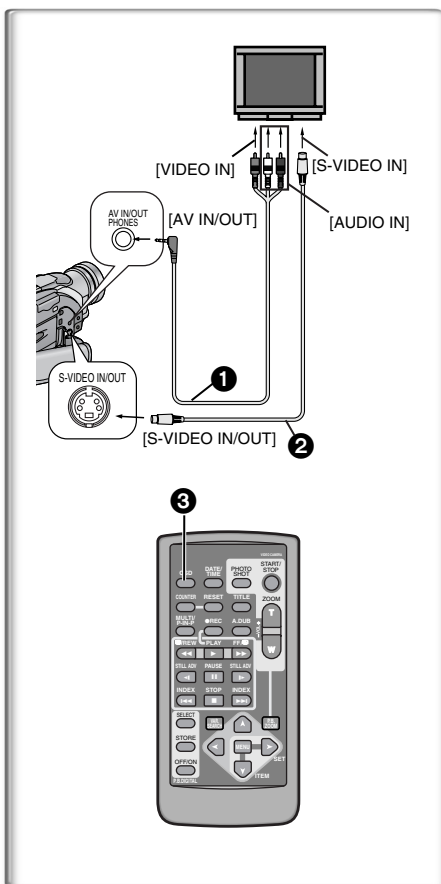
1 After displaying pictures in Multi-Picture Mode, rotate the [PUSH] Dial to select the image whose tape position you want to search.

• The selected picture blinks at the red frame.

2 Press Index Button [◀◀] or [▶▶] ④ on the Remote controller.

• A still picture playback takes place at the selected picture.

• For other notes, see page 48.



Playing Back on Your TV

By connecting your Camera/Recorder with your TV, the recorded scenes can be viewed on your TV screen.

- Before connecting them, turn off the power of both the Camera/Recorder and TV.

1 Connect the [AV IN/OUT] Jack of the Camera/Recorder to the Video and Audio Input Jacks of the TV.

- Using the A/V Cable ① (supplied), make a connection with the TV. If the TV has an S-Video Jack, connect the S-Video Cable (not supplied) ②, too. You may then remove the composite video (yellow) plug.

Making the Indications Appear on the TV screen

Press the [OSD] Button ③ on the Remote Controller.

- Be sure to select the proper input on your TV. (If necessary, consult your TV's operating instructions.)
- If you play back a Cassette recorded with copyright protection signals, the screen becomes blue or displays mosaic-like noise patterns.
- If you set [AV JACK] on the [AV IN/OUT SETUP] Sub-Menu to [IN/OUT], nothing will be shown on the TV screen except during playback.

~~~~~ Audio Dubbing ~~~~~

You can add music or narration to the recorded Cassette.

- If you perform audio dubbing onto a tape that was recorded with [AUDIO-REC] on the [RECORDING SETUP] Sub-Menu of the [CAMERA FUNCTIONS] Main-Menu set to [16bit], the original sound is erased. (If you want to preserve the original sound, use the [12bit] Mode when recording.)
- Audio Dubbing cannot be performed onto recordings made in LP Mode. (→ 19)

- 1 Set [VCR FUNCTIONS] >> [AV IN/OUT SETUP] >> [AV JACK] >> [IN/OUT].
- 2 And then select [A.DUB INPUT] >> [MIC] or [AV IN].
 - Set to [AV IN] when external sound equipment is used, or set to [MIC] when an external or built-in microphone is used.
- 3 Press the [▶] Button, and then press the [II] Button at the point where you want to start dubbing.
- 4 Press the [A.DUB] Button on the Remote Controller.
 - [A.DUB II] Indication appears. ①
- 5 To start Audio Dubbing, press the [II] Button on the Remote Controller.
 - [A.DUB >] Indication appears. ②

To Stop Audio Dubbing

Press the [II] Button on the Remote Controller.

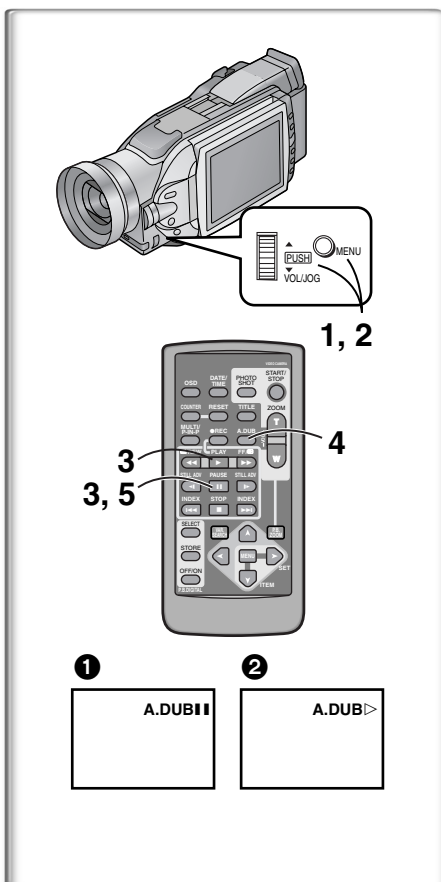
The Camera/Recorder is in the Still Playback Mode again.

Playing Back the Sound Recorded with Audio Dubbing (For 12 bit Audio Recording)

Set [VCR FUNCTIONS] >> [PLAYBACK FUNCTIONS] >> [AUDIO] >> [ST2] or [MIX].

- ST1: Play back only the original sound.
- ST2: Play back only the sound added by Audio Dubbing
- MIX: Play back both the original sound and the sound added by Audio Dubbing simultaneously.

- For other notes, see page 48.



Using a Memory Card

■ Inserting a Memory Card

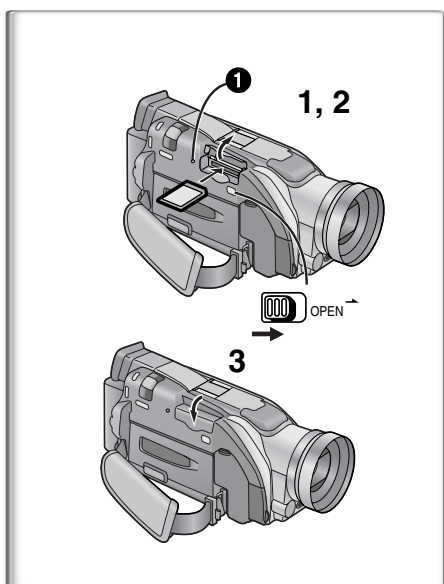
Before inserting a Memory Card, be sure to turn the Camera/Recorder off.

- 1 Slide the [OPEN] Lever to the right and open the Card Slot Cover.
- 2 While holding the Memory Card with its cut corner facing right, insert it into the Card Slot.
- 3 Close the Card Slot Cover.

■ [ACCESS] Lamp

While the Camera/Recorder is accessing the Card (reading, recording, playback, erasing, moving of images), the [ACCESS] Lamp ❶ lights up.

- While the [ACCESS] Lamp is on, never attempt to open the Card Compartment, to pull out the Card, to turn off the Camera/Recorder power, or to switch the [TAPE/CARD] Selector. Such actions will damage the Card and cause the Camera/Recorder to malfunction.



~~~~~ Recording on the Memory Card

Still pictures can be recorded on a Card from the Camera/Recorder lens as well as from scenes that have already been recorded on a cassette. The size of images that are recorded using this Camera/Recorder is approximately 1,680,000 pixels, and recording of images with a size that is larger than a million pixels is called mega-pixel still-picture recording. Compared to images of normal recording, images that are created by mega-pixel still-picture recording can be printed out clearer.

■ Card Photoshot

Recording a picture through the Camera/Recorder lens (CAMERA Mode)

- 1 Slide the [TAPE/CARD] Selector to [CARD].
 - 2 Set [PICTURE SIZE] on the [CARD SETUP] Sub-Menu to [1488×1128] or [640×480].
 - If you select [1488×1128], you can take pictures with higher resolution. (Mega-Pixel Recording)
 - 3 Press the [PHOTO SHOT] Button.
 - The [P] Indication will light in red. ❶
- During Card Photoshot recording, the following functions are disabled.
- Digital Zooming (→ 22)
 - Digital Effect Functions (→ 26, 27)
 - Title In/Creation (→ 37)
 - Frame Mode (→ 21)

- The Camera/Recorder is automatically turned off when you leave it for about 5 minutes without performing any photoshot recording.

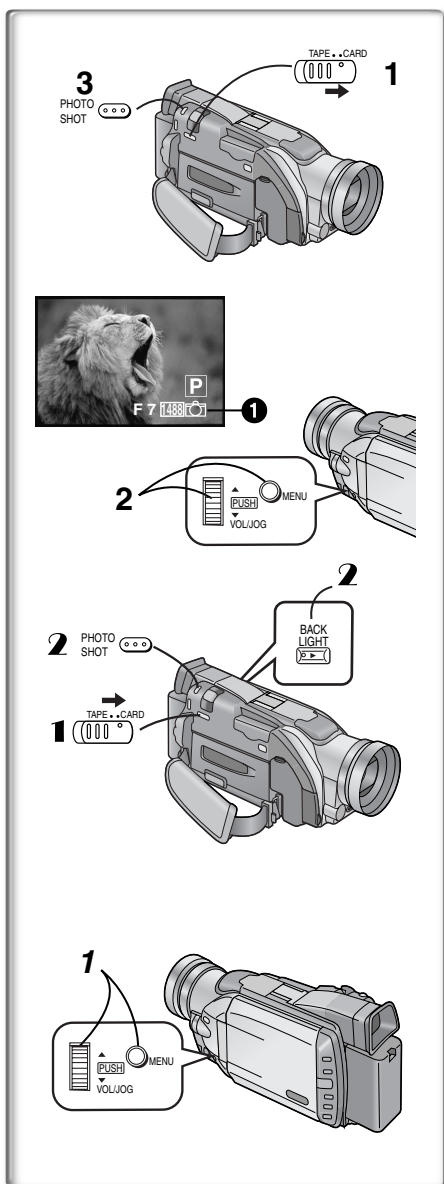
- When recording dark scenes, set [LOW LIGHT SHOT] on the [CARD SETUP] to [AUTO] and then record. (→ 48)

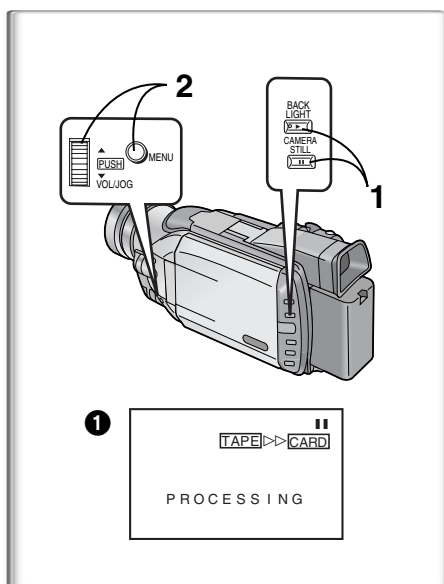
Recording from a cassette (VCR Mode)

- 1 Slide the [TAPE/CARD] Selector to [CARD].
 - 2 Start playback and press the [PHOTO SHOT] Button at the scene you want to record.
 - The size of the images input externally or recorded from a tape to the card becomes [640×480].
 - While the image is being recorded, it stays still for a few seconds.
- Please refer to "Recording to a Card from other equipment" (→ 48), regarding the recording to a card from other equipment.

Selecting the quality of Card Photoshot images

- 1 Set [CAMERA FUNCTIONS] or [VCR FUNCTIONS] >> [CARD SETUP] >> [REC MODE] >> a desired image quality (FINE, NORMAL, ECONOMY).





■ Automatically copying still pictures recorded on a cassette

The Camera/Recorder copies images automatically, referring to Photo Index signals.

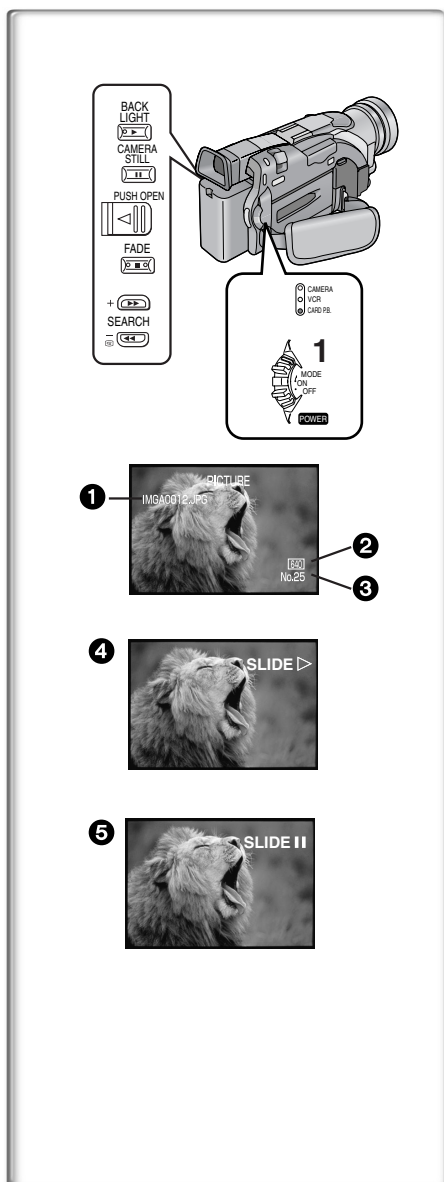
After setting to the VCR Mode (→ 28).....

- 1 Set the Camera/Recorder to Still Playback Mode just before the point where picture transfer is to commence.
- 2 Set [VCR FUNCTIONS] >> [PLAYBACK FUNCTIONS] >> [RECORD TO CARD] >> [YES].
 - Search starts from the current Cassette position, and images with Photo Index signals are recorded onto the Card sequentially.
 - While copying, the Indication ❶ appears.

To Stop the Transfer of Images

Press the [■] Button.

- For other notes, see page 48.



~~~~~ Playing Back Pictures from the Memory Card

- 1 Set the Camera/Recorder to Card Playback Mode.

- The [CARD P.B.] Lamp lights.
- The still picture that was recorded last on the Memory Card is displayed.

- ❶ File Name
- ❷ Picture Size (→ 44)
- ❸ File Number

To play back the later recorded pictures:

Press the [+SEARCH] Button

To play back the earlier recorded pictures:

Press the [-SEARCH] Button.

■ Playing back all the Pictures continuously (Slide Playback)

Press the [▶] Button.

The [SLIDE▶] Indication is displayed. ❹

- All pictures are played back for approximately 5 seconds each, from the first to the last recorded picture, and the playback then stops.

To Pause the Slide Playback

Press the [||] Button.

The [SLIDE||] Indication is displayed. ❺

- To restart slide playback, press the [||] Button again or press the [▶] Button. The slide playback starts from the next image and ends at the last displayed picture.

To Stop the Slide Playback

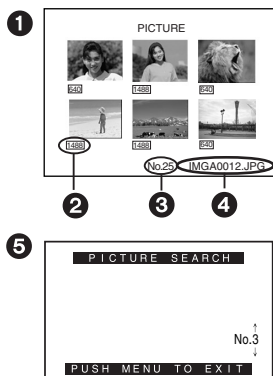
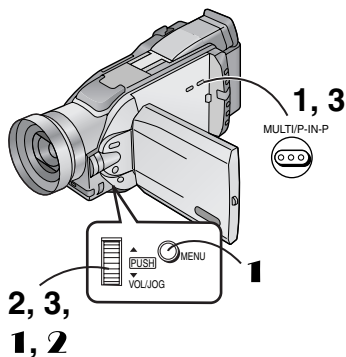
Press the [■] Button.

- To restart slide playback, press the [▶] Button. Slide playback starts from the next image, and, after all the recorded images are played back, slide playback stops at the image where you originally stopped slide playback.

- You can play back images with titles inserted in them. (→ 37)

However, it is not possible to display the titles or delete the displayed titles in the Slide Playback.

- When you play back the blank (not recorded) Memory Card, the screen turns white and the [NO PICTURE] Indication is displayed.
- When you play back still pictures which are recorded using other formats or pictures with incomplete data, the [×] indication or the [CARD ERROR] Indication may be displayed as a warning.
- For other notes, see page 48.



■ To Select a Desired Picture and Play it Back

After setting to the Card Playback Mode (→ 35).....

1 Press the [MULTI] Button.

- The still pictures recorded on the Memory Card are displayed in Multi-Picture Mode. ①

2 Rotate the [PUSH] Dial and select a desired picture.

- The selected picture is marked with a red frame.

3 Press either the [PUSH] Dial or the [MULTI] Button.

- The selected picture is shown on the entire screen.

② Picture Size

③ File Number

④ File Name

■ Using Picture Search Mode

1 Set [CARD FUNCTIONS] >> [CARD EDITING] >> [PICTURE SEARCH] >> [YES].

- The picture search screen ⑤ appears.

2 Rotate the [PUSH] Dial to select the desired number of the picture and then press it.

- The selected number's picture appears.

- The same setting can be performed using the short-cut menu (→ 18).

- For other notes, see page 48.

~~~~~ Copying pictures from a Memory Card to a Cassette

After setting to the Card Playback Mode (→ 35).....

To Copy One Picture

1 Slide the [TAPE/CARD] Selector to [TAPE].

2 Display a desired picture.

- Please refer to "To select a Desired Picture and Play it Back".

3 Press the [PHOTO SHOT] Button.

- It takes approximately 7 seconds to copy a still picture to the Cassette.
- During the copying, the Indication ① appears.

To Copy All the Pictures

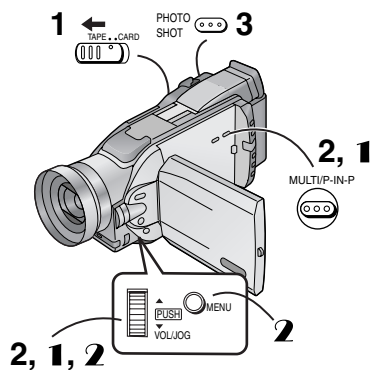
1 Display the first picture.

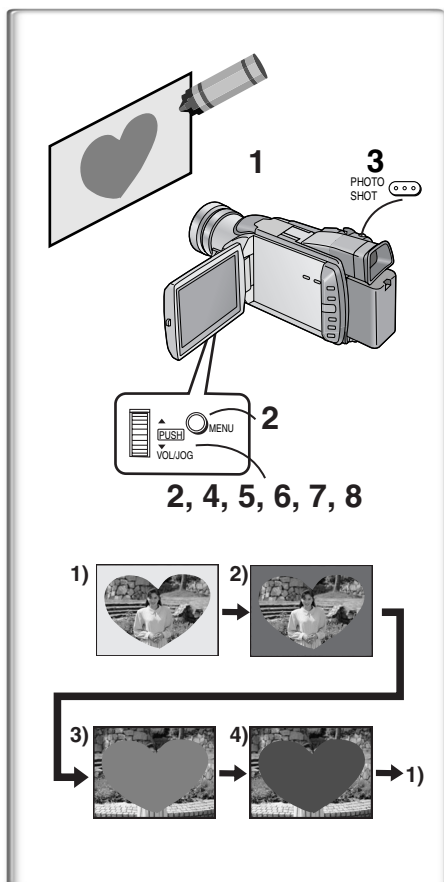
- If a picture other than the first one is displayed, only the subsequent pictures will be copied.

2 Set [CARD FUNCTIONS] >> [CARD EDITING] >> [RECORD TO TAPE] >> [YES].

- It takes approximately 7-11 seconds for each picture to be copied to the Cassette. To stop the copying midway, press the [■] Button.
- During the copying, the Indication ① appears.

- For other notes, see page 48.





Creating a Title

You can create a title and record on a Memory Card.

1 Camera Mode:

Set the Lens to the image you want to use for creating a title.

VCR Mode:

Search for the image you want to use for creating a title and set the Camera/Recorder to Still Playback Mode.

2 Set [CARD SETUP] >> [CREATE TITLE] >> [YES].

3 Press the [PHOTO SHOT] Button.

•To perform Photoshot again, select [RETURN].

4 Rotate the [PUSH] Dial to select [COLOR] and then press it.

5 Rotate the [PUSH] Dial to select desired color and press it.

6 Rotate the [PUSH] Dial to select [LUMINANCE] and press it.

7 Rotate the [PUSH] Dial to adjust the title contrast and then press it.

8 Select [RECORD] and then press the [PUSH] Dial.

Selecting Colors

If you make color selection by rotating the [PUSH] Dial when creating a title, you can change the color as follows.

1) Original color (the color of the captured image)

•Title in the original color in which the dark portion (blackish portion) of the captured image is missing.

2) Preset colors (black, blue, green, cyan, red, pink, yellow, and white)

•Title in a preset color in which the dark portion (blackish portion) of the captured image is missing.

3) Original color (the color of the captured image)

•Title in the original color in which the bright portion (whitish portion) of the captured image is missing.

4) Preset colors (black, blue, green, cyan, red, pink, yellow, and white)

•Title in a preset color in which the bright portion (whitish portion) of the captured image is missing.

Inserting a Title

You can select one of your original titles and display it. (It can be displayed in Camera Mode, VCR Mode, and Card Playback Mode.)

1 Press the [TITLE] Button.

•The title that was created last is displayed.

2 Press [MULTI] Button.

•A list of titles is displayed.

3 Rotate the [PUSH] Dial to select a desired title.

•The selected title is marked with a red frame.

4 Press the [PUSH] Dial or the [MULTI] Button.

•The selected title is displayed.

5 Using the [TAPE/CARD] Selector, select the recording target.

Camera Mode: TAPE or CARD

VCR Mode: CARD

Card Playback Mode: TAPE

6 Press the [PHOTO SHOT] Button.

•A still picture is recorded under the inserted title.

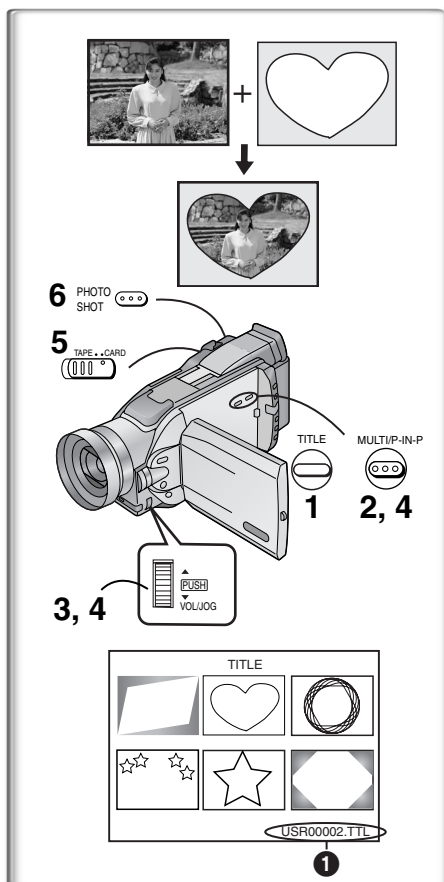
•If you record on a Cassette in Normal Recording Mode, set the [TAPE/CARD] Selector to [TAPE] and press the Recording Start/Stop Button.

1 File Name

Clearing a Title Display

Press the [TITLE] Button.

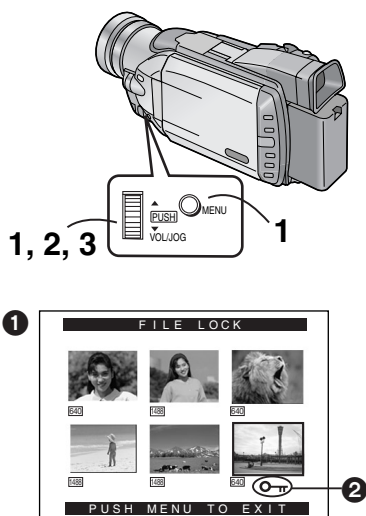
•For other notes, see page 48.



Protecting the Pictures on a Memory Card from Accidental Erasure (File Lock)

Precious pictures recorded on a Memory Card can be locked to prevent accidental erasure. (Even if pictures are locked, the pictures will be deleted when the Memory Card is formatted.)

After setting to the Card Playback Mode (→ 35).....



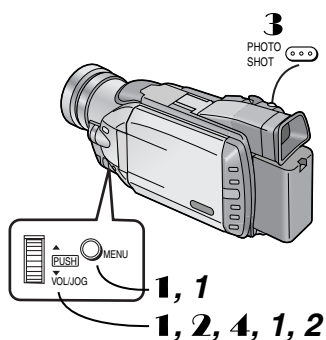
- 1 Set [CARD FUNCTIONS] >> [CARD EDITING] >> [FILE LOCK] >> [YES].
- 2 Rotate the [PUSH] Dial to select [PICTURE] or [TITLE], and then press it.
 - The [FILE LOCK] Menu ❶ is displayed.
- 3 Rotate the [PUSH] Dial to select the picture to be locked, and then press it.
 - The [O-TR] Indication ❷ is attached to the selected picture.
 - Press the [PUSH] Dial again to cancel.

• The same setting can be performed using the short-cut menu (→ 18).

Deleting the pictures recorded on a Memory Card

Using the Camera/Recorder, you can delete the still pictures and titles recorded on a Memory Card. **After the picture has been deleted, it cannot be restored.**

After setting to the Card Playback Mode (→ 35).....



To Select and Delete Picture(s) by selection

- 1 Set [CARD FUNCTIONS] >> [DELETE PICTURE/TITLE] >> [DELETE PICTURE BY SELECTION] or [DELETE TITLE BY SELECTION].
- 2 Rotate the [PUSH] Dial to select the picture that you want to delete, and then press it.
 - The selected picture flashes.
 - To delete more than 1 picture, repeat this step.
- 3 Press the [PHOTO SHOT] Button.
 - A verification message appears.
- 4 Rotate the [PUSH] Dial to select [YES] and then press it.
 - The selected picture is deleted from the Memory Card.

To Delete all Pictures

- 1 Set [CARD FUNCTIONS] >> [DELETE PICTURE/TITLE] >> [DELETE ALL PICTURES].
 - A verification message appears.
- 2 Rotate the [PUSH] Dial to select [YES] and then press it.
 - All the pictures stored in the Memory Card are deleted.
 - A locked picture cannot be deleted.

• The same setting can be performed using the short-cut menu (→ 18).

Formatting a Memory Card

If a Memory Card becomes unreadable by the Camera/Recorder, formatting it may make it reusable. Formatting will delete all the data recorded on a Memory Card.

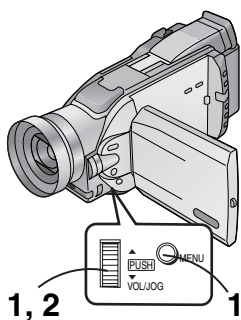
After setting to the Card Playback Mode (→ 35)....

1 Set [CARD FUNCTIONS] >> [CARD EDITING] >> [CARD FORMAT] >> [YES].

2 Select [YES] and press the [PUSH] Dial.

- During formatting the [PLEASE WAIT] Indication ❶ appears.
- When the formatting is completed, the screen becomes white.
- Even if pictures are locked, the pictures will be deleted when the Memory Card is formatted.

• For other notes, see page 48.



DPOF Setting

You can write the images to be printed, the number of prints, and other print-related information (DPOF setting) on a Memory Card. "DPOF" stands for Digital Print Order Format, and since printing data can be added to images on the Memory Card, the Memory Card can be used with any system that provides DPOF.

After setting to the Card Playback Mode (→ 35)....

1 Set [CARD FUNCTIONS] >> [CARD EDITING] >> [DPOF SETTING] >> [YES].

2 Rotate the [PUSH] Dial to select [VARIABLE] and then press it.

3 Rotate the [PUSH] Dial to select the picture and then press it.

4 Rotate the [PUSH] Dial to set the number of prints ❶ and then press it.


- The framed images will be set to DPOF and the [●] ❷ will be displayed. The [●] mark indicates pictures for which 1 or more prints have been set.

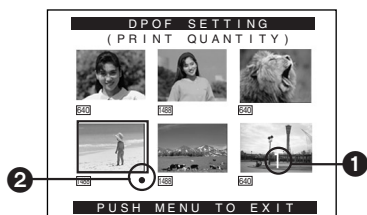
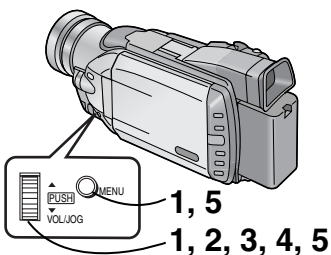
- When printing one each of all the pictures, select [ALL 1]; if not all the pictures are printed, select [ALL 0].

5 Repeat Step 2 - 4 to set other pictures, and press the [MENU] Button when the setting is completed.

To Verify DPOF Setting

Select [VERIFY] in Step 2 above. The pictures for which 1 or more prints are set in DPOF are played back continuously.

-  Print mark is based on DPOF (Digital Print Order Format).
- The same setting can be performed using the short-cut menu (→ 18).
- For other notes, see page 48.



■ About the SD Memory Card and MultiMediaCard

SD Memory Card

The SD Memory Card is virtually the same size as a MultiMediaCard. It is an external memory card that is available in larger capacities. It has a write protect switch to prevent data writing and card formatting, as well as a copyright protection function.

- SD Logo is a trademark.

MultiMediaCard

The MultiMediaCard is a compact, lightweight and removable external memory card.

- All other company and product names in the operating instructions are trademarks or registered trademarks of their respective corporations.

Still pictures recorded on a SD Memory Card or MultiMediaCard

It may not be possible to play back the pictures on this Camera/Recorder recorded on and created by other equipment or vice versa. For this reason, check the compatibility of the equipment in advance.

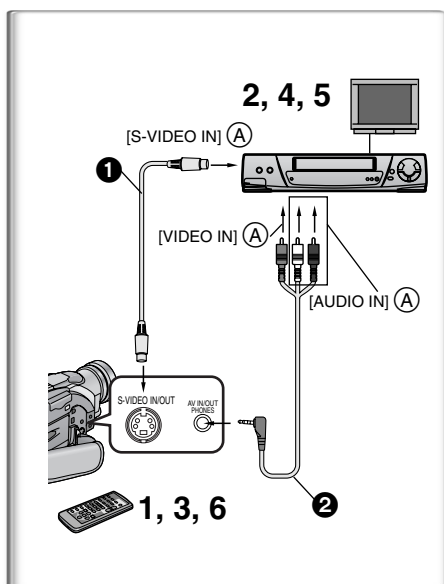
■ About the compatibility of the card images

Image data files recorded on “SD Memory Card”s or “MultiMediaCard”s by this Camera/Recorder conform with DCF (Design Rules for Camera Files Systems universal standard) established by JEIDA (Japan Electronic Industry Development Association).

- If you attempt to play back images recorded with this Camera/Recorder in other equipment or to play back images recorded with other equipment in this Camera/Recorder, you may not be able to play them back. Please check the compatibility with other equipment in advance.

■ About the folder structure when using the Memory Card in a Computer

- If you insert a Memory Card in your Computer, the folder should be displayed as below.
 - [100cdpfp]: The images in this folder (Imga0001.jpg etc.) have been recorded in JPEG format.
 - [Misc]: This folder contains files which set up in DPOF data
 - [Title]: This folder contains data of original titles (Usr00001.jpg, Usr00001.ttl etc.)
- [Dcim], [Im01cdpf], [Private] and [Vtf] are necessary items for the folder structure. In actual use you do not have to be concerned about them.
- In the Card Photoshot Mode, the Camera/Recorder automatically saves the image under a file name (Imga0001.jpg etc.). File names are recorded with each picture as running numbers.



Copying your DV Cassette to an S-VHS or VHS Cassette (Dubbing)

After connecting the Camera/Recorder and the S-Video, Video and Audio Input Jacks (A) of the VCR as illustrated on the left, start the following procedures.

- Be sure to press the [OSD] Button on the Remote Controller before copying so that no indications are left visible. Otherwise, the displayed tape counter and Function indications are also copied.

[Camera/Recorder]

1 Insert the recorded Cassette.

[VCR]

2 Insert a blank Cassette with an erasure prevention tab.

- If various settings (such as external input, tape speed, etc.) are required, please refer to the operating instructions of your VCR.

[Camera/Recorder]

3 Press the [▶] Button to start playback.

[VCR]

4 Start recording.

5 Press the Pause or Stop Button to stop recording.

[Camera/Recorder]

6 Press the [■] Button to stop playback.

- ① S-Video Cable (not supplied) ② A/V Cable (supplied)

Copying an S-VHS or VHS Cassette to your DV Cassette

After connecting the Camera/Recorder and the S-Video, Video and Audio Output Jacks (B) of the other equipment as illustrated on the left, start the following procedures.

- You need the Remote Controller.

[Camera/Recorder]

1 Set [VCR FUNCTIONS] >> [AV IN/OUT SETUP] >> [AV JACK] >> [IN/OUT].

2 Insert an blank Cassette with an erasure prevention tab.

[Other Equipment]

3 Insert a recorded Cassette and start playback.

[Camera/Recorder]

4 While pressing the [REC] Button, press the [PLAY] Button. (Both buttons are located on the Remote Controller.)

5 Press the [II] Button or [■] Button to stop recording.

[Other Equipment]

6 Press the Stop Button to stop playback.

- ① S-Video Cable (not supplied) ② A/V Cable (supplied)

Analogue-Digital Conversion

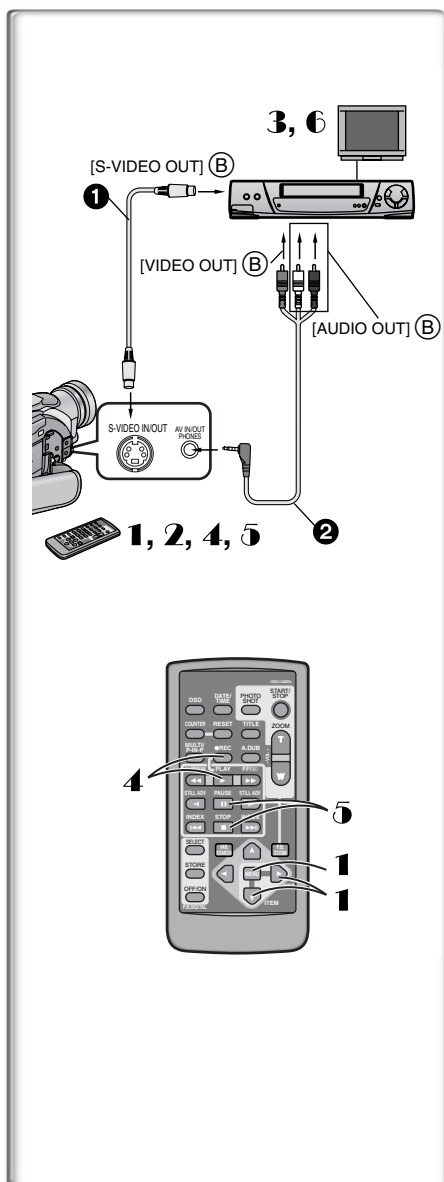
When the Camera/Recorder is connected with other digital video equipment through its DV Terminal, the analogue format pictures which have been input from other external equipment can be output to the digital video equipment through the DV Terminal.

- To DV-output analogue video signals sent from other equipment, set [DV OUT] on the [AV IN/OUT SETUP] Sub-Menu to [ON]. (Normally, keep the [DV OUT] set to [OFF]. If it is set to [ON], the quality of the image may be disturbed.)

CAUTION:

Unauthorized exchanging and/or copying of copyrighted recordings may be copyright infringement.

- Please refer to "Recording to a Card from other equipment" (→ 48), regarding the recording to a Card.





Using your Camera/Recorder with Digital Video Equipment (Dubbing)

By connecting this Camera/Recorder with other digital video equipment (such as another Camera/Recorder of the same type) that has a DV input/output terminal (i.LINK) using a DV Interface Cable ❶, high quality images and sounds can be dubbed in the digital mode.

[Playback Unit (A)]

1 Insert the recorded Cassette and set the Camera/Recorder to the VCR Mode.

[Recording Unit (B)]

2 Insert a Cassette to be used for dubbing and set the Camera/Recorder to the VCR mode.

[Playback Unit (A)]

3 Press the [▶] Button to start playback.

[Recording Unit (B)]

4 While pressing the [REC] Button, press the [PLAY] Button. (Both Buttons are located on the Remote Controller.)

•Recording starts.

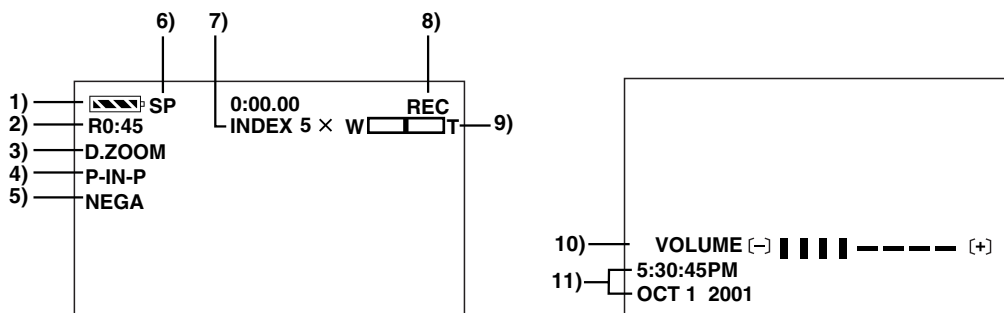
Stopping Dubbing

Press the [■] Button on the recording unit first, and then press the [■] Button on the playback unit to stop dubbing.

CAUTION:

Unauthorized exchanging and/or copying of copyrighted recordings may be copyright infringement.

•For other notes, see page 48.



Indications

Various functions and Camera/Recorder conditions are displayed on the screen.

1) Remaining Battery Power []

- When the battery power becomes low, the indication changes. When the battery is discharged completely, the [] ([]) Indication flashes.
- When you are using the AC Adaptor, the [] Indication may appear, however, this has no meaning in this case.

2) Remaining Tape Time [R0:00]

- Remaining tape time is indicated in minutes. When it reaches less than 3 minutes, the indication starts flashing.

3) Digital Zoom [D.ZOOM] (→ 22)

Playback Zoom [ZOOM 5×] (→ 31)

4) Digital Effects 1

- MULTI: Multi-Picture Mode (→ 27, 32)
- P-IN-P: Picture-in-Picture Mode (→ 27)
- WIPE: Wipe Mode (→ 26, 31)
- MIX: Mix Mode (→ 26, 31)
- STROBE: Strobe Mode (→ 26, 31)
- GAIN-UP: Gain-up Mode (→ 26)
- TRAIL: Trailing Effect Mode (→ 26, 31)
- MOSAIC: Mosaic Mode (→ 26, 31)
- MIRROR: Mirror Mode (→ 26, 31)

5) Digital Effects 2

- NEGA: Negative Mode (→ 26, 31)
- SEPIA: Sepia Mode (→ 26, 31)
- MONO: Black & White Mode (→ 26, 31)
- SOLARI: Solarization Mode (→ 26, 31)

6) Recording Speed Mode

- SP: Standard Play Mode (→ 19)
- LP: Long Play Mode (→ 19)

7) Index

- For several seconds while index signals are being recorded, the [INDEX] Indication flashes. (→ 30)

Search Number [S 1] (→ 30)

- The figure indicates which number of scene ahead from the present scene is to be played back.

8) Tape Run Indications

- REC: Recording (→ 20)
- PAUSE: Recording Pause (→ 20)
- ▷: Playback/Camera Search in forward direction (→ 20, 28)
- ◁: Camera Search in reverse direction (→ 20)
- II: Still Playback (→ 29)
- ▷▷: Fast-forward/Cue Playback (→ 28)
- ◁◁: Rewind/Review Playback (→ 28)
- II▷: Slow Playback in forward direction (→ 29)
- ◁II: Slow Playback in reverse direction (→ 29)
- II▷: Still Advance Playback in forward direction (→ 29)
- ◁II: Still Advance Playback in reverse direction (→ 29)
- ▷▷: Index Search in forward direction (→ 30)
- ◁◁: Index Search in reverse direction (→ 30)
- CHK: Recording Check (→ 20)
- A.DUB ▷: Audio Dubbing (→ 33)
- A.DUB II: Audio Dubbing Pause (→ 33)
- PHOTO: Photoshot Mode Recording (→ 21)
- BLANK: Blank Search (→ 29)
- R ▷: Repeat Playback (→ 28)
- 2x ▷▷: Variable Speed Search (→ 28)

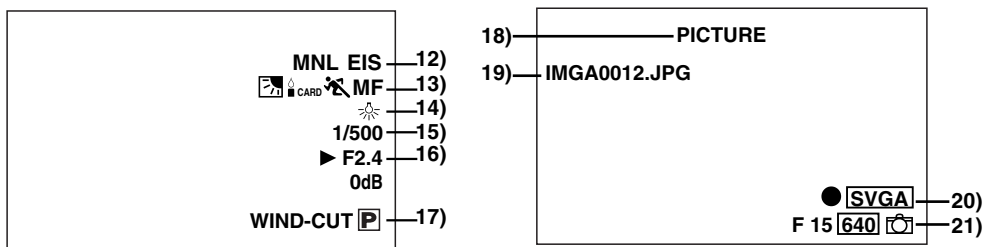
9) Zoom Magnification

- When the [W/T] Zoom Lever is pushed up or down, the Zoom Magnification Indication and Zoom Gauge appear. (→ 21, 22)

10) Sound Volume

- Use this indication to adjust the volume of playback sound from the built-in speaker or headphones. (→ 28)

11) Date/Time Indication [5:30:45PM /OCT 1 2001] (→ 19, 45)



12) Recording Mode

- **AUTO:** This appears when Mode Selector Switch is set to [AUTO]. (→ 20)
- **MNL:** This appears when Mode Selector Switch is set to [MANUAL]. (→ 23, 24, 25)
- **AE LOCK:** This appears when Mode Selector Switch is set to [AE LOCK]. (→ 24)

Optical Image Stabilizer [EIS] (→ 22)

Audio Dubbing Input Display [MIC/AV IN] (→ 33)

Audio Recording Mode [12bit/16bit] (→ 19, 33)

13) Manual Focus [MF] (→ 23)

Back Light Mode [P.L.] (→ 23)

Low Light Shot [CARD] (→ 34)

Program AE Mode

- : Sports Mode (→ 23)
- : Portrait Mode (→ 23)
- : Low Light Mode (→ 23)
- : Spotlight Mode (→ 23)
- : Surf & Snow Mode (→ 23)

14) White Balance Mode

- **AWB:** Automatic White Balance Mode (only camera data (→ 17))
- : Indoor Mode (recording under incandescent lamp) (→ 25)
- : Outdoor Mode (→ 25)
- : Fluorescent light Mode (→ 25)
- : Last manually adjusted White Balance setting (→ 25)

15) Shutter Speed [1/500] (→ 24)

16) Iris Value [F2.4] (F number) (→ 24)

17) Wind Noise Reduction [WIND-CUT] (→ 16)

Progressive Photoshot Mode [P.] (→ 21)

18) File Type Display [PICTURE/TITLE] (→ 35, 37)

19) File Name Display (→ 35, 36, 37)

20) Card Picture Indications 1

- **DPOF setting (setting for 1 or more print) [●] (→ 39)**

- **Number set DPOF [00] (→ 39)**

- **Picture size [640/1488] (→ 34, 35)**

When you playback a scene recorded on a Camera/Recorder with a picture size specification different from the one stated above, the following indications should be displayed. If the size of the picture is from 640 pixels to 800 pixels, the [640] Indication will be displayed; if picture size is 640 pixels or lower, the scene should be displayed without any indication of picture size.

- **[SVGA]** : From 800 to 1024 pixels
- **[XGA]** : From 1024 to 1280 pixels
- **[SXGA]** : From 1280 to 1600 pixels
- **[UXGA]** : Above 1600 pixels

21) Card Picture Indications 2

- **Card Photoshot picture quality [N/F/E] (→ 34)**

(Card Photoshot Recording) [F] is Fine, [N] is Normal, [E] is Economy in abbreviated terms.

- **Recording in Card Photoshot [red] (→ 34)**

- **Memory Card is not inserted [red] (→ 34)**

- **Card Photoshot is ready to record [cyan] (→ 34)**

- **File number [No.000] (→ 35)**

- **Remaining number of Card Photoshot Picture [000] (→ 34)**

- **Lock setting [O-P] (→ 38)**

■ Changing the Counter Display Mode

By changing [C.DISPLAY] on the [DISPLAY SETUP] Sub-Menu, you can change the Counter Display Mode to Tape Counter Indication (0:00.00), Memory Counter Indication (M0:00.00), or Time Code Indication (0h00m00s00f).

- You also can press the [COUNTER] Button of the Remote Controller repeatedly to change the Counter Indication.

■ Displaying Date/Time Indication

To display Date/Time Indication, set the appropriate date/time in [DATE/TIME] on the [DISPLAY SETUP] Sub-Menu.








- You also can press the [DATE/TIME] Button of the Remote Controller repeatedly to display or change the Date/Time Indication.

■ Changing the Display Mode


By changing [DISPLAY] on the [DISPLAY SETUP] Sub-Menu, Counter Display Mode changes to All Function Display, Partial Display, and Minimum Display.

Warning/Alarm Indications

If any one of the following indications lights up or flashes, please check the condition of the Camera/Recorder.

- EJECT TAPE:** After the [DEW DETECTED] Indication appears, eject the Cassette.
-  **CHECK REC TAB :** The erasure prevention tab on the inserted Cassette is open (that is, set to [SAVE]).
-  **CANNOT REC :** When you are attempting to do audio dubbing on the unrecorded (blank) portion of the tape, or you are attempting to do dubbing on the Cassette whose tab is set at [SAVE]. (→ 33, 41, 42)
-  **TAPE NOT INSERTED:** No Cassette is inserted. (→ 13)
-  **LOW BATTERY:** The Battery is low. Recharge it. (→ 12)
-  **:** The internal lithium battery is low. (→ 19)
-  **END/TAPE END:** The tape ended during recording.
- REMOTE/ CHECK REMOTE MODE:** Wrong Remote Controller Mode has been selected. (→ 11)
- CANNOT REC LP-MODE:** Because the original recording was done in LP Mode, audio dubbing cannot be performed. (→ 33)
- INCOMPATIBLE DATA:** This Cassette is incompatible or contains copy-guard. Because the medium is protected by a copy guard, images cannot be recorded correctly.
- INCOMPATIBLE TAPE:** When an incompatible Cassette is detected, this Indication will appear for approximately 5 seconds. If this Indication appears, return the LCD Monitor to the original position in order to check the specific content of the Warning/Alarm Indication.
-  **:**

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- NO CARD:** When you are attempting to record on the Memory Card during dubbing (→ 41) on the Cassette. There is no Memory Card inserted.
- PLEASE WAIT:** When reading the Memory Card (playback, format, when using the Multi-Picture Function). (→ 35, 36, 39)
- CARD ERROR:** The Memory Card is not compatible with the Camera/Recorder.
- CARD DOOR OPENED:** Card Slot Cover is opened. After inserting the Memory Card correctly, close the Card Slot Cover.
- CHANGE TO TAPE MODE:** When you are attempting to record on the Memory Card in the Card Playback Mode. Change to the VCR Mode or slide the [TAPE/CARD] Selector to [TAPE].
- CHANGE TO CARD MODE:** When you are attempting to record on the Cassette in the VCR Mode. Change to the Card Playback Mode or slide the [TAPE/CARD] Selector to [CARD].
- FILE LOCKED:** When you are attempting to delete a locked picture. The locked picture cannot be deleted.
- WRITE PROTECTED:** When you are attempting to write the data on an SD Memory Card whose write protection switch is set at [LOCK].
- NO PICTURE:** There are no pictures in the Memory Card.
- NO TITLE:** There are no titles in the Memory Card.
- NO SPACE LEFT:** When a Still Picture is transferred from a Cassette to an already full Memory Card.
- CHANGE TO 640×480:** Titles cannot be displayed. (→ 37) Set to the [640×480].
- ×** Pictures of a different format or damaged pictures are being played back. (→ 35)
- UNABLE TO WRITE:** If you are attempting to record the title multi screen on the Memory Card in the Camera Mode or VCR Mode.
- PUSH THE RESET SWITCH:** If this Indication appears, press the [RESET] Button. (→ 9)
- NEEDS TO BE SERVICED:** If this Indication appears, take the Camera/Recorder to a service center for repair.
- U10:** Wait until the [DEW DETECTED] Indication disappears. (→ 50)
- DEW DETECTED:** Condensation has occurred. (→ 50)
- U11:** Clean the Video head. (→ 50)
-  **NEED HEAD CLEANING:** The video heads are dirty. (→ 50)

Notes & Precautions

■ Power-Related Items (→ 12)

- When the Camera/Recorder is used for a long time, the Camera body becomes warm, but this is not a malfunction.
- If the [CHARGE] Lamp does not light up although the Battery is attached, detach the Battery and reattach it.

■ Inserting/Ejecting the Cassette (→ 13)

- In the case of using a previously recorded Cassette, you can use the Camera Search Function to find the position where you want to continue recording.
- If a new Cassette is inserted, rewind to the beginning of the tape before starting recording.

If the Cassette Holder Does Not Go Back in:

- Press the [PUSH TO CLOSE] mark and close the Upper Cassette Compartment Cover firmly.
- Turn off the Camera/Recorder and then turn it on again.
- Check if the Battery is weak.

If the Cassette Holder Does Not Come Out:

- Close the Lower Cassette Compartment Cover completely. Then, open it again.
- Check if the Battery is weak.

■ Recording (→ 20)

- Before turning on the Camera/Recorder, remove the Lens Cap. If the lens cap is still attached when the Camera/Recorder is turned on, Automatic White Balance Adjustment may not function correctly.

■ Recording Check (→ 20)

- For recording check, the Camera/Recorder must be the same as the recording speed Modes (SP/LP) used for the recording. Otherwise the playback images will be distorted.

■ Camera Search (→ 20)

- In Camera Search Mode, images may contain mosaic-like noise patterns. This is a phenomenon that is characteristic of Camera/Recorder and not a malfunction.
- If the recording speed Modes (SP/LP) of previous recording and new recording are different, playback images may be distorted.

■ Progressive Photoshot Function (→ 21)

- When you change to the still picture Mode, you will hear a click. This is the sound of the iris closing and not an indication of malfunction.
- If you record still pictures in Progressive Photoshot Mode when your Camera/Recorder is set to Program AE, the brightness of the images may vary.

About [PROGRESSIVE] Setting

- When the [P] Indication is displayed, you can use the Progressive Photoshot Function.

When [PROGRESSIVE] is set to [ON]:

You can use the Progressive Photoshot Function at any time. In this case, however, the following functions are disabled.

- [EFFECT1] Digital Effect Modes
- Digital Zoom [D.ZOOM]
- 1/750 or faster shutter speed
- Continuous Photoshot Function
- Frame Mode

When [PROGRESSIVE] is set to [AUTO]:

You cannot use the Progressive Photoshot Function in the following circumstances.

- When the zoom magnification is approximately 10 × or higher
- When the shutter speed is 1/750 or faster

- When [EFFECT1] is set to [WIPE][MIX][STROBE][GAIN-UP][TRAIL][MOSAIC][MIRROR]
- When the pictures are displayed on a Multi screen or P-IN-P screen
- Continuous Photoshot Function
- Frame Mode
- The surrounding brightness is not enough.

■ Zoom In/Out Functions (→ 21, 22)

- By pressing the [W/T] zoom lever to [W] or to [T] in Recording Pause Mode, you can zoom 1-10 × at the maximum speed of 0.3 seconds.
- During recording, you can zoom 1-10 × in as short a time as approximately 0.8 seconds.
- During considerably fast zooming, the image may become out of focus temporarily.
- When you are zooming on a faraway subject, a sharper focus is achieved if the recording subject is approximately 4 feet (1.2 m) or more away from the Camera/Recorder.

■ Optical Image Stabilizer Function (→ 22)

- After-images may appear.
- We recommend that you turn off the Image Stabilizer Function when a Tripod is in use.
- Within the digital zoom range, or when recording with a conversion lens attached, the Image Stabilizer Function may not work effectively.

■ Fade In/Out Mode (→ 22)

Fading-in and fading-out cannot be used when recording still pictures in the Photoshot Mode, Digital Still Picture Mode and Multi-Picture Mode.

■ Program AE (→ 23)

- If any of the Program AE Modes is selected, you cannot adjust the shutter speed or iris.
- You cannot use Sports Mode, Portrait Mode and Low Light Mode with Gain-up Mode [GAIN-UP].

Sports Mode

- During normal playback, the image movement may not look smooth.
- Because the color and brightness of the playback image may change, avoid recording under fluorescent light, mercury light, or sodium light.
- If you record a subject illuminated with strong light or a highly reflective subject, vertical lines of light may appear.
- If the light is insufficient, the [] Indication flashes.

Sports Mode/Portrait Mode

- If you record a still picture in Progressive Photoshot Mode, the brightness of the recorded still picture may become unstable.
- If these modes are used for indoor recording, playback images may flicker.

Low Light Mode

- Extremely dark scenes may not be able to be made brighter to a satisfactory degree.

Spotlight Mode

- With this Mode, recorded images may turn out to be extremely dark.
- If the recording subject is extremely bright, its recorded image may turn out to be whitish.

Surf & Snow Mode

- If the recording subject is extremely bright, its recorded image may turn out to be whitish.

■ Manual Shutter Speed Adjustment (→ 24)

- You may see vertical lines of light in the playback image of a brightly shining subject or highly reflective subject.
- During Normal Playback, transition from one scene to another may not look smooth.
- Because the color and brightness of the playback image may become unstable, avoid recording under fluorescent light, mercury light, or sodium light.
- If you are using either Gain-up Mode or Program AE Mode, you cannot adjust the shutter speed. If the shutter speed is adjusted manually, this setting will be cancelled.

■ Manual Iris Adjustment (→ 24)

- Depending on zoom magnification, the iris value may not be displayed correctly.
- If you are using either Gain-up Mode or Program AE Mode, you cannot adjust the iris. If the iris is adjusted manually, those Modes will be cancelled.
- The [OPEN] iris value is displayed as [F1.6] in the camera data (→ 17).
- When you use Gain-up Mode, the range of selectable iris value is limited up to [OPEN6dB].

■ White Balance (→ 25)

- In the Automatic White Balance Adjustment Mode, the [AWB] Indication appears for the camera data. (→ 17)
- In the following cases, You cannot change White Balance:**

- When you set [EFFECT1] of [DIGITAL EFFECT] Sub-Menu on the [CAMERA FUNCTIONS] Main-Menu to [GAIN-UP] or [EFFECT2] to [SEPIA] or to [MONO].
- When you set the Zoom to 10 X or higher, you cannot change the White Balance.
- During Digital Still Picture Mode.
- When you display a Menu.

In the following cases, the [] Indication flashes:

- The flashing indicates that the previously adjusted White Balance setting is still kept. This setting will be kept until White Balance is adjusted again.
- You may not be able to achieve correct White Balance adjustment manually under weak illumination.

■ Digital Effect Functions (Camera Mode) (→ 26)

- If you set [EFFECT1] on [DIGITAL EFFECT] Sub-Menu to [GAIN-UP], you need to adjust the focus manually. However, you cannot adjust the shutter speed and select the White Balance.
- If [EFFECT2] on the [DIGITAL EFFECT] Sub-Menu is set to [MONO] or [SEPIA], the selected White Balance Mode cannot be changed.
- You cannot use Sports Mode, Portrait Mode and Low Light Mode with Gain-up Mode [GAIN-UP].

In the following cases, using the [EFFECT1] on the [DIGITAL EFFECT] Sub-Menu (including Multi-Picture Mode & P-IN-P Mode) is not possible.

- Frame Mode
- When [PROGRESSIVE] is set to [ON]
- Card Photoshot Mode

In the following case, using the Digital Effect Function (including Multi-Picture Mode & P-IN-P Mode) is not possible.

- Card Photoshot Mode

■ Wipe Mode and Mix Mode (Camera Mode) (→ 26)

If either one of the following operations is carried out, stored images will be erased, and Wipe and Mix Functions cannot be used.

- Use the Camera Search Function.
- Press the [CAMERA STILL] Button.
- Switch the [TAPE/CARD] Selector.
- Slide the [OFF/ON/MODE] Switch.
- Selecting any other digital effect function on the [DIGITAL EFFECT] Sub-Menu.

■ Multi-Picture Mode (Camera Mode) (→ 27)

- If the [MULTI] Button is pressed while self-recording Mirror mode (→ 20) is used, the still picture is displayed from the upper right corner of the screen, but, in reality, the picture is recorded from the upper left corner as usual.
- The quality of images recorded in Multi Mode deteriorates slightly.
- Multi Mode cannot be used in digital still picture mode (→ 21) or when Card Photoshot recording is set.

■ P-IN-P Mode (→ 27)

- Pictures in P-IN-P Mode cannot be recorded with Progressive PhotoShot.
- If the Camera/Recorder power is turned off, the smaller picture will disappear.
- A title cannot be inserted into the smaller picture.
- If the [CAMERA STILL] Button is pressed in P-IN-P Mode, the setting is cancelled.

■ Index Search Functions (→ 30)

- Index Search may not be possible at the beginning of tape.
- Because Photoshot Index Signals are not recorded on still pictures recorded in Continuous Photoshot Mode, the Photoshot Index Function cannot be used for these still pictures.
- Scene Index Search may not function properly if the interval between 2 scene index signals is shorter than 1 minute.

■ Playback Zoom Functions (→ 31)

- You cannot adjust volume in Playback Zoom Mode.
- If you turn off the Camera/Recorder or if you switch from VCR Mode to Camera Mode, Playback Zoom Mode is automatically cancelled.
- Even if Playback Zoom Functions are being used, images that are output from the DV Terminal are not enlarged.
- As you enlarge an image, the quality of image suffers.
- You cannot use the Mirror Mode of Digital Effects and the Playback Zoom Functions simultaneously.
- If you select Multi-Picture Mode in the Playback Zoom Mode, equivalent magnification (1X) becomes zoom magnification.

■ Playback Digital Effect Functions (→ 31)

- Signals of images to which digital effects are added during playback cannot be output from the DV Terminal.
- You cannot use the Wipe Function or Mix Function while playing back the non-recorded portion of tape.
- You cannot use the Mirror Mode of Digital Effects and the Playback Zoom Function simultaneously.

■ Multi-Picture Mode (VCR Mode) (→ 32)

- The quality of Multi images deteriorates slightly.
- Playback multi-mode screens cannot be output through DV Terminal.
- If there is input from DV Terminal, a multi screen cannot be created.
- When signals are input from Video Input/Output Jack or Audio-Video Input/Output Jack, a multi screen cannot be re-displayed.
- Signals input from Video Input/Output Jack or Audio-Video Input/Output Jack cannot be displayed on a multi screen.

■ Listening to Playback Sound Through Headphones (→ 28)

If you want to listen to the playback sound of a tape through headphones, set [AV JACK] on the [AV IN/OUT SETUP] Sub-Menu to [OUT/PHONES] and connect the headphones to the [PHONES] Jack on this Camera/Recorder. In this case, no sound (including a warning sound and shutter sound) will be reproduced through the built-in speaker of the Camera/Recorder. When the A/V Cable is inserted into the AV Jack, the internal speaker works.

■ Selecting the Sound during Playback (→ 28, 33)

You can select the sound by using the [AUDIO OUT] on the [PLAYBACK FUNCTIONS] Sub-Menu.

STEREO: Stereo Sound (main sound and sub sound)
L: Left channel sound (main sound)
R: Right channel sound (sub sound)

- If you dub a tape recorded at the [12bit] selected as the [AUDIO-REC] setting, playback sound becomes stereo sound regardless of whether [AUDIO] is set to [MIX] or to [AUDIO OUT].

■ Audio Dubbing (→ 33)

- The blank section of a tape cannot be dubbed.
- Sounds sent through the DV Terminal cannot be dubbed.
- If a tape has a non-recorded portion when the tape is dubbed, images and sounds may be disturbed when this portion of the tape is played back.
- If you set the tape counter back to 0 at the position where you want to stop Audio Dubbing so as to make it possible to use the Memory Stop function (→ 52), Audio Dubbing is terminated automatically when the tape reaches this position.
- In the case of importing data recorded with Audio Dubbing to a Computer using the Computer's software program, only the original sound (ST1) may be imported, depending on the software program.

■ Microphone Jack

When audio dubbing is carried out through an external microphone or audio equipment, connect it to the [MIC] Jack. In this case, the built-in microphone of the Camera/Recorder will be turned off.

■ Card Functions (→ 34 - 39)

- Do not touch the connector terminal located on the back of the card.
- If the Card Slot Cover is open, the card cannot be accessed.
- Wide images cannot be recorded on the Memory Card.
- A card that was formatted with this Camera/Recorder may not be usable in other equipment. If this happens, please format the card with the equipment with which the card is to be used. Before proceeding with this operation, we suggest that you take the precautionary measure of storing important images in your personal computer.
- In the Card Photoshot mode, the Camera/Recorder automatically saves the file names (Imga0001.jpg, etc.) along with the pictures. A file name is recorded with each picture as a running number.

■ Recording to a Card from other equipment (→ 34, 41)

If you set the [TAPE/CARD] Selector to [CARD], you can use the Card Photoshot Function for externally input signals. (Not during recording.)

- Black streaks may appear at the four edges of the image.
- When the [PHOTO SHOT] Button is pressed, the image may seem to move backward momentarily, but this does not affect the recording.

■ Card Photoshot Recording (→ 34)

- The Progressive Function is set to [ON].
- The shutter speed becomes 1/60-1/500.
- When viewed on a TV or liquid crystal monitor, image quality deteriorates slightly.
- The screen becomes slightly wider.
- Mega-pixel images cannot be recorded on a cassette as a Mega-pixel picture.

■ Low Light Shot (→ 34)

- When recording in low-light conditions, set [LOW LIGHT SHOT] to [AUTO]. When the Shutter Speed is 1/30, Low Light Shot operates and the [CARD] Indication is displayed.
- The brightness of the picture may change with Low Light Shot.
- When Shutter Speed (→ 24) is set and Program AE (→ 23) is set, [LOW LIGHT SHOT] will not operate even if set to [AUTO].

■ Card Playback (→ 35)

- In the case of displaying memory images on a Multi screen, if there are 7 or more images, they cannot be displayed all at once. Rotate the [PUSH] Dial or use the [-SEARCH] Button or [+SEARCH] Button to display the next 6 still pictures.
- When pictures recorded by another Camera/Recorder are played back with this Camera/Recorder, the size of the pictures may be different from the recorded size.

■ Title Functions (→ 37)

- Regardless of the [PICTURE SIZE] setting, the size of created title picture is [640×480].
- If you create an original title, the number of pictures that can be recorded on the Memory Card decreases.
- If the number of pictures that can be recorded on the Memory Card is small, you may not be able to create an original title in some cases.
- When a title is displayed in VCR Mode, the title is not output from the DV Terminal.
- When the [TAPE/CARD] Selector is set to [CARD] and [1488×1128] is selected for [PICTURE SIZE], titles are not displayed.

■ DPOF setting (→ 39)

- The number of prints can be set from 0 to 99.
- Perform DPOF setting on the Camera/Recorder you are using.
- It may take some time to verify the DPOF setting. Please wait until the [ACCESS] Lamp goes off.

■ Using your Camera/Recorder with Digital Video Equipment (Dubbing) (→ 42)

- Regardless of the setting, dubbing is carried out automatically in the same audio recording Mode as that of the Cassette in the playback-side equipment.
- The images on the monitor of the recording side may be disturbed, but it does not affect the recorded images.
- Even if Playback Digital Effects, Playback Zoom or Playback Title In have been used, these effects are not output from the DV Terminal.
- Even if you use a device with DV Terminals (such as i.LINK), you may not be able to perform digital dubbing in some cases.

Caution for Use

■ After Use

- 1 Take out the Cassette. (→ 13)
- 2 Set the [OFF/ON/MODE] Switch to [OFF]. (→ 14)
- 3 Detach the Battery and retract the Viewfinder. (→ 12)
- 4 To protect the Lens, attach the supplied Lens Cap. (→ 13)

■ Tips for using your Camera/Recorder

When you use your Camera/Recorder on a rainy or snowy day or on a beach, make sure that no water enters the Camera/Recorder.

- Water may cause the Camera/Recorder or Cassette to malfunction. (Irreparable failure may occur.)
- If sea water splashes onto the Camera/Recorder, wet a soft cloth with tap water, wring it well, and use it to wipe the Camera/Recorder body carefully. Then, wipe it again thoroughly with a soft dry cloth.

Keep the Camera/Recorder away from magnetically charged equipment (such as a Microwave oven, TV, game equipment, etc.)

- If you use the Camera/Recorder near a TV, images or sounds may be disturbed due to electromagnetic wave radiation.
- Strong magnetic fields created by speakers or large motors may damage previous recording on the tape, or images may be distorted.
- Electromagnetic wave radiation generated by a microprocessor may adversely affect the Camera/Recorder, causing the disturbance of images and sounds.
- If the Camera/Recorder is affected by magnetically charged equipment and does not function properly, turn off the Camera/Recorder power and detach the Battery or AC Adaptor and then connect the Battery or AC Adaptor again. Thereafter, turn on the Camera/Recorder power.

Do not use your Camera/Recorder near radio transmitters or high-voltage lines.

- If you record pictures near radio transmitters or high-voltage lines, recorded images or sounds may be adversely affected.

Do not use this Camera/Recorder for surveillance purpose or other business use.

- If you use the Camera/Recorder for a long time, the internal temperature increases and, consequently, this may cause malfunction.
- This Camera/Recorder is not intended for industrial use.

When you use your Camera/Recorder on a beach or similar place, do not let sand or fine dust get into the Camera/Recorder.

- Sand or dust may damage the Camera/Recorder or Cassette. (Care should be taken when inserting and ejecting the Cassette.)

Do not spray insecticides or volatile chemicals onto the Camera/Recorder.

- If the Camera/Recorder is sprayed with such chemicals, the Camera/Recorder body may deform and the surface finish may peel off.
- Do not keep rubber or plastic product in contact with the Camera/Recorder for a long period of time.

When cleaning the Camera/Recorder, do not use any solvent, such as benzine, alcohol, thinner, etc.

- The Camera/Recorder body may become damaged and the surface finish may peel off.
- Before cleaning, detach the Battery or pull out the AC Cable from the AC Jack.
- Wipe the Camera/Recorder with a soft, dry cloth. To remove stubborn stains, wipe with a cloth that is soaked in a detergent diluted with water and afterward finish wiping with a dry cloth.
- For storing or transporting the Camera/Recorder, place it in a bag or case lined with soft pads so as to prevent the coating on the Camera/Recorder body from being worn.

After use, be sure to take the Cassette out and detach the Battery from the Camera/Recorder or pull out the AC Cable from AC Jack.

- If the Cassette is left in the Camera/Recorder, the tape sags and deteriorates.
- If you leave the Battery attached to the Camera/Recorder for a long time, the voltage drops excessively, and the Battery will not function even after it is recharged.

■ About the AC Adaptor

- If the temperature of the Battery is extremely high or extremely low, the [CHARGE] Lamp may continue flashing, and the Battery may not charge. After the temperature of the Battery has decreased or increased sufficiently, charging starts automatically. If the [CHARGE] Lamp continues to flash even after the Battery temperature has decreased or increased sufficiently, the Battery or AC Adaptor may be faulty. In this case, please contact your dealer.
- If the Battery is warm, charging takes a longer time than normal.
- If you use the AC Adaptor near a radio, radio reception may be disturbed. Keep the AC Adaptor 1 meter or more away from radio.
- When the AC Adaptor is in use, it may generate whirring sounds. However, this is normal.
- After use, be sure to pull out the AC Cable from the AC Jack. (If they are left connected, a small amount of electricity is consumed.)
- Always, keep the electrodes of the AC Adaptor and Battery clean.

■ Condensation

If excessive moisture condenses in the unit, [DEW DETECTED] Indication will flash, and the Camera/Recorder will automatically turn off after about 1 minute.

If this happens, follow the steps below:

1 Take out the Cassette.

- None of the other functions operate. Depending on the amount of condensation, removing the Cassette may even become difficult. If this happens, wait for 2 to 3 hours before taking the Cassette out.

2 Open the Cassette Compartment and wait for 2 to 3 hours.

- The number of hours to wait depends on the amount of condensation and ambient temperature.

3 2 to 3 hours later, turn on the Camera/Recorder and check to see if the [DEW DETECTED] Indication is displayed.

- Even if the [DEW DETECTED] Indication is not displayed, as a precaution, please wait for another hour before using the Camera/Recorder.

Watch for Condensation Even Before the [DEW DETECTED] Indication Is Displayed.

- Because condensation takes place gradually, the [DEW DETECTED] Indication may not be displayed during the first 10 to 15 minutes of condensation formation inside the Camera/Recorder.
- In extremely cold places, condensation may freeze and form frost. In this case, the frost melts first, thus forming condensation, and then it takes another 2 to 3 hours to eliminate the condensation.

When the Lens Is Fogged:

Set the [OFF/ON/MODE] Switch to [OFF] and leave the Camera/Recorder in this condition for about 1 hour. When the lens temperature becomes close to the ambient temperature, the fog disappears naturally.

■ Digital Video Head Cleaner

If the heads (the parts that make contact with tape) are dirty, mosaic-like noise patterns may appear on the playback image, or the screen as a whole becomes black. If the heads are extremely dirty, recording performance deteriorates, and, in the worst case, the Camera/Recorder cannot record at all.

Causes of Digital Video Heads

- Large quantity of dust in the air
- High-temperature and high-humidity environment
- Damaged tape
- Long operating hours

Using Mini-DV Format Digital Video Head Cleaner

- 1 Insert the Head Cleaner into the Camera/Recorder in the same manner as a Video Cassette.
- 2 Press the [▶] Button, and 20 seconds later, press the [■] Button. (Do not rewind the tape.)
- 3 Take out the head cleaner. Insert a Video Cassette and start recording. Then, play the tape back to check the recorded image.
- 4 If the image is not still clear, repeat Steps 1 to 3. (Do not use the Head Cleaner for 3 times or more consecutively.)

Notes:

- Do not rewind every time you use the Head Cleaner. Rewind only when the tape reaches the end, and then use it again from the beginning in the same manner as before.
- If the heads become dirty soon after cleaning, the tape may be damaged. In this case, immediately stop using that Cassette.
- Do not clean the heads excessively. (Excessive cleaning may cause excessive wear of the heads. If the heads are worn, images cannot be played back even after the heads are cleaned.)
- If the dirty heads cannot be cleaned with the head cleaner, the Camera/Recorder needs to be cleaned at a service center. Please consult a distributor.
- Video head cleaners can be purchased from service centers.
- Head cleaning due to dirty heads is not considered a malfunction of the product. It is not covered by the warranty.

Periodical Check-up

To maintain the highest image quality, we recommend replacement of worn parts, such as heads, etc., after approximately 1000 hours of use. (This, however, depends on operating conditions, such as temperature, humidity, dust, etc.)

■ Optimal Use of the Battery

Battery Characteristics

This Battery is a rechargeable lithium ion battery. Its ability to generate power is based upon the chemical reaction that takes place inside it. This reaction is susceptible to the surrounding temperature and humidity, and, if the temperature is too high or too low, the operating time of the Battery becomes shorter. If the Battery is used in an extremely cold environment, the Battery may operate only for about 5 minutes. If the Battery becomes extremely hot, a protective function may operate, and the Battery may become unusable for a while.

Be Sure to Detach the Battery After Use

Be sure to detach the Battery from the Camera/Recorder. (If it is left attached to the Camera/Recorder, a minute amount of current is consumed even when the Camera/Recorder power is off.) If the Battery is left attached to the Camera/Recorder for a long time, over-discharge takes place. The Battery may become unusable even after it is charged.

Disposing of an unusable Battery

- The Battery has a limited life.
- Do not throw the Battery into fire because it may cause an explosion.

Always Keep the Terminals of the Battery Clean

Prevent the terminals from getting clogged with dirt, dust, or other substances.

If you drop the Battery accidentally, check to see if the Battery body and terminals are damaged.

Attaching a deformed Battery to the Camera/Recorder or AC Adaptor may damage the Camera/Recorder or AC Adaptor.

■ Cautions for Storage

Before storing the Camera/Recorder, take the Cassette out and detach the Battery.

Store all the components in a dry place with a relatively stable temperature.

- Recommended Temperature: 59 °F to 77 °F (15°C to 25 °C)
- Recommended Humidity: 40% to 60%

Camera/Recorder

- Wrap it with a soft cloth to prevent dust from getting into the Camera/Recorder.
- Do not leave the Camera/Recorder in places that expose it to high temperature.

Battery

- Extremely high temperatures or low temperatures will shorten the life of the Battery.
- If the Battery is kept in smoky or dusty places, the terminals may rust and cause malfunctions.
- Do not allow the Battery terminals to come in contact with metal objects (such as necklaces, hairpins, etc.). This can result in a short circuit or heat generation and, if you touch the Battery in this condition, you may be badly burned.
- Store the Battery in a completely discharged state. To store the Battery for a long period of time, we recommend you charge it once every year and store it again after you completely use up the charged capacity.

Cassette

- Before storing it, rewind the tape to the beginning. If the Cassette is left for more than 6 months with the tape stopped midway, the tape sags (although it depends on the storage condition). Be sure to rewind to the beginning.
- Store the Cassette in its case. Dust, direct sunlight (ultraviolet rays), or humidity may damage the tape. Dust contains hard mineral particles, and dusty Cassettes damage the heads of the Camera/Recorder and other components. Develop a habit of returning the Cassette back to its case.
- Once every half year, wind the tape to the end and then rewind it to the beginning. If the Cassette is left for 1 year or longer without winding or rewinding, temperature and humidity changes may cause the Cassette to deform due to swelling, shrinking, and so forth. The wound tape may stick to itself.
- Do not place a Cassette near highly magnetic substances or equipment.
- The surface of tape is covered with extremely minute magnetic particles, upon which signals are recorded. Magnetic necklaces, toys, etc., have magnetic force that is stronger than you may expect, and they may erase the contents of a recording or may cause noise in images and sounds.

■ LCD Monitor/Viewfinder/Lens Hood

LCD Monitor

- In a place with drastic temperature changes, condensation may take place on the LCD Monitor. Wipe it with soft, dry cloth.
- If your Camera/Recorder is extremely cold when you turn its power on, the image on the LCD Monitor is slightly darker than usual at first. However, as the internal temperature increases, it goes back to the normal brightness.

Extremely high precision technology is employed to produce the LCD Monitor screen featuring a total of approximately 200,000 pixels. The result is more than 99.99% effective pixels with a mere 0.01% of the pixels inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

Viewfinder

- Do not direct the Viewfinder or Lens to the sun. Internal components may be seriously damaged.
- When the Camera/Recorder is used with a large capacity Battery attached to it, it is not practical to look in the Viewfinder from behind the Battery. In this case, lift up the Viewfinder to an easy-to-see angle.

Extremely high precision technology is employed to produce the Viewfinder screen featuring a total of approximately 113,000 pixels. The result is more than 99.99% active pixels with a mere 0.01% of the pixels inactive or always lit. However, this is not a malfunction and does not affect the recorded picture.

■ MC Protector/ND Filter

When attaching the supplied ND Filter or Wide conversion Lens, be sure to first remove the MC Protector (→ 8) by turning it counterclockwise.

- If you attach both the filter and the Wide Conversion Lens, the four corners of the picture may become dark (vignetting effect).

MC Protector

- Since this filter neither affects the colors nor the amount of light, it can always be left attached to protect the Movie Camera's lens.
- It reduces invisible ultraviolet rays and prevents the picture from becoming bluish.

ND Filter (ND-8) (→ 6)

- This filter reduces the amount of light to approximately 1/8th but does not affect the colors.
- The depth of field is slightly reduced.
- White balance adjustment is possible even with the ND Filter attached. However, when using the ND Filter and recording with Auto White Balance, the white balance adjustment may not be precise. Therefore, we recommend that you use the Manual White Balance Mode when recording with the ND Filter attached.
- When you record with the ND Filter attached and zoom to the extreme wide-angle setting, the four corners of the picture may become dark (vignetting effect).

Explanation of Terms

Digital Video System

In a digital video system, images and sounds are converted into digital signals and recorded on a tape. This complete digital recording is capable of recording and playback with minimal image and sound deterioration.

In addition, it automatically records data, such as Time Code and date/time, as digital signals.

Compatibility with S-VHS or VHS Cassettes

Because this Camera/Recorder employs a digital system for recording image and sound data, it is not compatible with conventional S-VHS or VHS video equipment that employs an analogue recording system.

The size and shape of the Cassette are also different.

Compatibility with Output Signals

Because AV signal output from the AV signal output jack is analogue (the same as conventional video systems), this Camera/Recorder can be connected with S-VHS or VHS video or a TV for playback.

Focus

Auto Focus Adjustment

The Auto Focus System automatically moves the internal focusing lens forward or backward and adjusts the focus so that the subject can be seen clearly.

However, the Auto Focus System does not function properly under the following recording conditions.

Please use the Manual Focus Mode instead.

- 1) **Recording a subject whose one end is located closer to the Camera/Recorder and the other end farther away from it.**
 - Because Auto Focus makes adjustments at the center of an image, it may be impossible to focus on a subject that is located in both foreground and background.
- 2) **Recording a subject behind dirty or dusty glass.**
 - Because the focus is on the dirty glass, the subject behind the glass will not be focused.
- 3) **Recording a subject in dark surroundings.**
 - Because the light information that comes through the lens decreases considerably, the Camera/Recorder cannot focus correctly.
- 4) **Recording a subject that is surrounded by objects with glossy surfaces or by highly reflective objects.**
 - Because the Camera/Recorder focuses on the objects with glossy surfaces or on highly reflective objects, the recording subject may become blurry.
- 5) **Recording a fast-moving subject.**
 - Because the focus lens inside moves mechanically, it cannot keep up with the fast-moving subject.
- 6) **Recording a subject with little contrast.**
 - Because the Camera/Recorder achieves focus based upon the vertical lines of an image, a subject with little contrast, such as a white wall, may become blurry.

White Balance Adjustment

Depending on the type of light source, the colors recorded by the Camera/Recorder may be affected. In some cases, images may be recorded with bluish or reddish hue. To minimize the effect of light on the subject's color, what is called White Balance Adjustment becomes necessary.

White Balance Adjustment

White Balance Adjustment recognizes the color of light and makes adjustment so that the white color will become pure white.

Auto White Balance Adjustment

This Camera/Recorder stores settings that are optimal for several kinds of general light sources. The Camera/Recorder determines the hue of light that it receives through the lens and White Balance Sensor, thereby judging the recording condition, and selects the closest hue setting. This function is called Auto White Balance Adjustment.

However, since white balance settings for only certain kinds of light sources are stored, the Auto White Balance Function does not operate properly when recording occurs under light that is out of the range of the setting values.

Time Code

Time Code signals are data that indicate time measured in hours, minutes, seconds, and frames (30 frames per second). If this data is included in a recording, an address is assigned to each image on the tape.

- The Time Code is automatically recorded as a part of the sub-code at each recording.
- When a new (previously unrecorded) Cassette is inserted, the Time Code automatically starts from zero. If a recorded Cassette is inserted, the Time Code picks up from the point where the last scene was recorded. (In this case, when the Cassette is inserted, the zero display [0h00m00s00f] may appear, but the Time Code starts from the previous value.)
- The Time Code cannot be reset to zero.
- Unless the Time Code is continuously recorded from the beginning of a tape, accurate editing may not be possible. To ensure that the Time Code will be recorded with no breaks, we recommend the use of the Camera Search Function (→ 20) or the Blank Search Function (→ 29) before recording a new scene.

Memory Stop Function

The Memory Stop Function is useful for the following operations.

Rewinding or fast-forwarding a tape to a desired position

- 1 **Set [C.DISPLAY] on the [DISPLAY SETUP] Sub-Menu to [MEMORY].**
- 2 **Reset the Tape Counter to zero at the tape position you will want to play it back from later. (→ 10, 16)**
- 3 **Start playback or recording.**
- 4 **When playback or recording is over: slide the [OFF/ON/MODE] Switch from on to put the Camera/Recorder in the VCR Mode.**
 - The [VCR] Lamp lights up.
- 5 **Rewind the tape.**
 - The tape automatically stops approximately at the position where the counter was set to zero.

Stopping editing automatically during audio dubbing

- 1 **Set [C.DISPLAY] on the [DISPLAY SETUP] Sub-Menu to [MEMORY].**
- 2 **Reset the Tape Counter to zero at the position where you want to stop editing.**
- 3 **Play back the still pictures where you want to start audio dubbing.**
- 4 **Start audio dubbing. (→ 33)**
 - Audio dubbing automatically stops at the position where the counter was set to zero.

Specifications

Digital Camera/Recorder Information for your safety

Power Source:	DC 7.8/7.2 V
Power Consumption:	Recording 7.0 W
Recording Format:	Mini DV (Consumer-use Digital Video SD Format)
Tape Used:	6.35 mm digital video tape
Recording/Playback Time:	SP: 80 min.; LP: 120 min. (with DVM80)
Video	
Recording System:	Digital Component
Television System:	EIA Standard: 525 lines 60 Fields NTSC color signal
Audio	
Recording System:	PCM Digital Recording 16 bit (48 kHz/2track), 12 bit (32 kHz/4track)
Image Sensor:	1/6-inch 3 CCD Image Sensor
Lens:	Auto Iris, F1.6, Focal Length; 2.85-28.5 mm, Macro (Full Range AF)
Filter Diameter:	37 mm
Zoom:	10:1 Power Zoom
Monitor:	3.5-inch Polycrystalline Silicon Active Matrix TFT LCD
Finder:	Color Electronic Viewfinder
Microphone:	Stereo
Speaker:	1 round speaker 20 mm
Standard Illumination:	1,400 lx
Minimum Required Illumination:	15 lx
Video Output Level:	1.0 Vp-p, 75 ohm
S-Video Output Level:	Y Output: 1.0 Vp-p, 75 ohm C Output: 0.286 Vp-p, 75 ohm
Audio Output Level:	316 mV, 600 ohm
Video Input Level:	1.0 Vp-p, 75 ohm
S-Video Input Level:	Y Input: 1.0 Vp-p, 75 ohm C Input: 0.286 Vp-p, 75 ohm
Audio Input Level (Line):	316 mV, 10 kohm or more
Mic Input:	Mic sensitivity -50 dB (0 dB = 1 V/Pa, 1 kHz) (Stereo mini jack)
Digital Interface:	DV Input/Output Terminal (i.LINK, 4-pin)
Dimensions:	3-5/8(W)× 2-7/8 (H)× 7-5/8 (D) inch 72 (W)× 90 (H)× 195 (D) mm
Weight:	1.48lbs. (0.67 kg) (without Battery and DV cassette)
Operating Temperature:	32 °F -104 °F (0 °C-40 °C)
Operating Humidity:	10%-80%

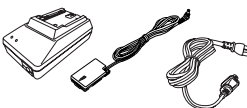
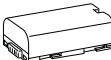

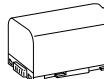
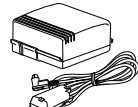






Card Memory Functions
Recording Media: SD Memory Card, MultiMediaCard
Image Compression: JPEG

AC Adaptor Information for your safety

Power Source:	AC 110-240 V, 50/60 Hz
Power Consumption:	18 W
DC Output:	DC 7.8 V, 1.4 A (Camera/Recorder Operation) DC 8.4 V, 1.2 A (Battery Charging)
Dimensions:	2-3/4 (W) × 1-3/4 (H) × 4-9/16 (D) inch 70 (W) × 45 (H) × 116 (D) mm
Weight:	0.363lbs. (0.165 kg)

Weight and dimensions shown are approximate.
Designs and specifications are subject to change without prior notice.

Camera/Recorder Accessory System

Accessory#	Figure	Description
AG-B15P		AC Adaptor with AC Cable and DC Cable
*CGR-D08A/1B (Replaces *CGR-D120A/1B)		800mAh/Rechargeable Lithium Ion Battery Pack
*CGR-D16A/1B (Replaces *CGR-D220A/1B)		1600mAh/Rechargeable Lithium Ion Battery Pack
*CGP-D28A/1B		2800mAh/Rechargeable Lithium Ion Battery Pack
*CGR-D53A/1K (Replaces *CGR-D815A/1B)		5300mAh/Rechargeable Lithium Ion Battery Pack
BN-SDCAPU/1B		USB Reader/Writer for SD Memory Card (compatible with MultiMediaCard)
BN-SDABPU/1B		SD PCMCIA Adaptor (compatible with MultiMediaCard)
RP-SD008		8MB SD Memory Card
RP-SD016		16MB SD Memory Card
RP-SD032		32MB SD Memory Card
RP-SD064		64MB SD Memory Card

*Please refer to page 12, for information regarding the battery charging time and available recording time.

Before Requesting Service

If you are experiencing a problem with your Digital Camera/Recorder, it may be something you can correct yourself. Check the list below for Problems and Solutions.

Problems	Solutions
The Camera/Recorder power cannot be turned on.	Is the power source connected correctly?
The Camera/Recorder power is turned off automatically.	If you leave the Camera/Recorder in Recording Pause Mode for more than 5 minutes, the power is turned off automatically to protect the tape and to save the Battery power.
The Camera/Recorder power does not stay on long enough.	Is the Battery low? Charge the Battery or attach a fully charged Battery.
Something is wrong with the Camera/Recorder's operation. The Camera/Recorder is turned on but no functions operate.	Press the [RESET] Button on the Camera/Recorder with a pointed object. If this does not solve the problem, first disconnect the power supply and wait for a minute or so, and then reconnect the power supply to turn the power back on. (If the above operation is performed when the [ACCESS] Lamp of the Card Slot is lighting, the data of the Card may be damaged.)
Battery runs down quickly.	<ul style="list-style-type: none"> ● Is the Battery fully charged? Charge it with the AC Adaptor. ● Are you using the Battery in an extremely cold place? In cold places, the operating time of the Battery becomes shorter. ● Has the Battery worn out? If the operating time is still too short even after the Battery is fully charged, the Battery has worn out.
The Battery cannot be charged.	If the DC Cable is connected to the AC Adaptor, charging cannot be performed. Disconnect the DC Cable.
Recording does not start although power is supplied to the Camera/Recorder and the Cassette is correctly inserted.	<ul style="list-style-type: none"> ● Is the accidental erasure protection slider on the Cassette open? If it is open (set to [SAVE]), recording cannot be performed. ● Is the tape wound to the end? Insert a new Cassette. ● Is the Camera/Recorder power turned on? ● Is the [CAMERA] Lamp on? If the [CAMERA] Lamp is not on, no recording function can be operated. ● Has condensation occurred? Wait until the [DEW DETECTED] Indication disappears.
Audio dubbing cannot be performed.	<ul style="list-style-type: none"> ● Is the accidental erasure prevention slider on the Cassette open? If it is open (set to [SAVE]), recording cannot be performed. ● Are you attempting to edit a tape portion that was recorded in LP Mode? LP Mode does not allow audio dubbing to operate.
The Time Code becomes inaccurate.	The Time Code Indication counter may not be constant in the reverse direction in Slow Motion Playback Mode, but this is not a malfunction.
The Remaining Tape Time Indication disappears.	When you record still pictures in Photoshot Mode, the Remaining Tape Time Indication may disappear temporarily. However, it reappears when the Camera/Recorder is set back to Normal Recording Mode.
The Remaining Tape Time Indication does not match the actual remaining tape time.	<ul style="list-style-type: none"> ● If scenes of less than 15 seconds are continuously recorded, the remaining tape time cannot be displayed correctly. ● In some cases, the Remaining Tape Time Indication may show remaining tape time that is 2 to 3 minutes shorter than the actual remaining tape time.

If you are experiencing a problem with your Digital Camera/Recorder, it may be something you can correct yourself. Check the list below for Problems and Solutions.

Problems	Solutions
Images cannot be played back even when the [▶] Button is pressed.	Is the [VCR] Lamp on? If the [VCR] Lamp is not on, the playback function cannot be used.
Mosaic-like noise patterns appear on images during Cue, Review or Slow Motion Playback.	This phenomenon is characteristic of digital video systems. It is not a malfunction.
Although the Camera/Recorder is correctly connected to a TV, playback images cannot be seen.	Have you selected Video Input on the TV? Please read the operating instructions of your TV and select the channel that matches the input jacks used for the connection.
Playback image is not clear.	Are the heads of the Camera/Recorder dirty? If the heads are dirty, playback image cannot be clear.
No sound is played back from the built-in speaker or headphones of the Camera/Recorder.	Is the volume too low? During playback, continue pressing the [PUSH] Dial until the [VOLUME] Indication appears. Then, rotate the [PUSH] Dial to adjust the volume.
Different sounds are reproduced at the same time.	[AUDIO] on the [PLAYBACK FUNCTIONS] Sub-Menu of the [VCR FUNCTIONS] Main-Menu has been set to [MIX]. As a result, the original sound and sound that was recorded by audio dubbing are played back together. It is possible to reproduce the sounds separately.
The original sound was erased when audio dubbing was performed.	If you perform audio dubbing on a recording done in [16bit] Mode, the original sound will be erased. If you want to preserve the original sound, be sure to select [12bit] Mode at the time of recording.
Sounds cannot be played back.	<ul style="list-style-type: none"> • Although a Cassette with no audio dubbing is being played, is [AUDIO] on the [PLAYBACK FUNCTIONS] Sub-Menu of the [VCR FUNCTIONS] Main-Menu set to [ST2]? To play back a Cassette with no audio dubbing, [AUDIO] must be set to [ST1]. • Is the Variable Speed Search Function working? Press the [▶] Button to cancel the Variable Speed Search Function.
The recorded picture on the Memory Card is not clear.	Do you have [REC MODE] on the [CARD SETUP] Sub-Menu set to [ECONOMY]? If recording is done with it set to [ECONOMY], a detailed image may show a mosaic pattern. Set the [REC MODE] to [NORMAL] or [FINE]. (→ 34)
Card Photoshot playback pictures do not look normal.	There is a possibility that the images are damaged. To prevent the loss of image data, we recommend that you back images up on a Cassette or personal computer. (→ 36)
Even if a Card is formatted, it cannot be used.	There is a possibility of damage to either the Camera/Recorder or the Card. Please contact Panasonic Call Center.

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